Sep. 1988
No. 60001

JVC Service Manual

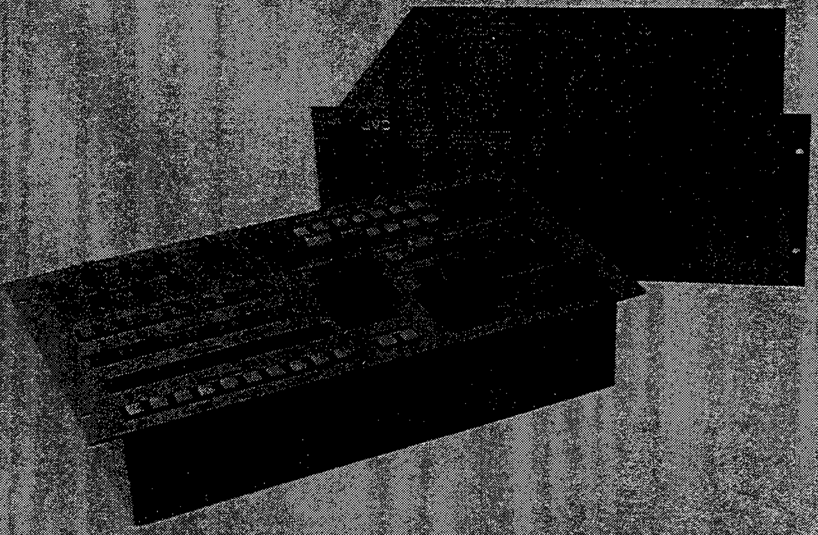
COLOUR SPECIAL EFFECTS GENERATOR

MODEL KM-2500

VICTOR COMPANY OF JAPAN, LIMITED

No. 60001

JVC Service Manual



KM-2500

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▒) parts are critical for safety.
   Replace only with specified part numbers.
   Note: **Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.**

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:

1) Insulation Tape	3) Spacers	5) Barrier
2) PVC tubing	4) Insulation sheets for transistors	

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

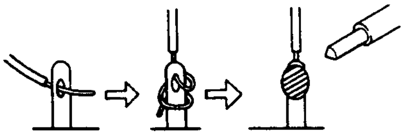


Fig. 1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

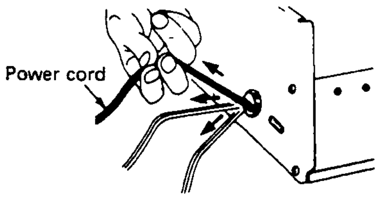


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

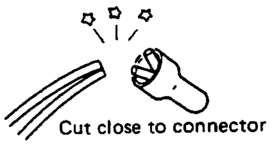


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

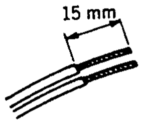


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

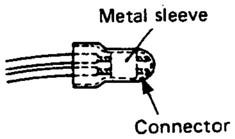


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

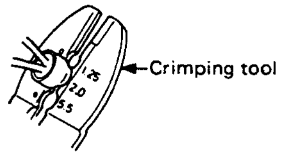


Fig. 6

(5) Check the four points noted in Fig. 7.

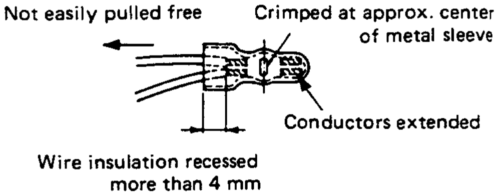

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. **Dielectric strength test**
Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. **Clearance distance**
When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

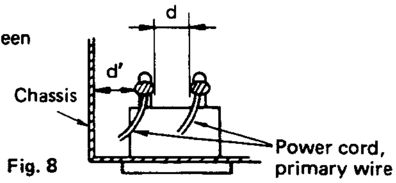


Fig. 8

4. **Leakage current test**
Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).
Measuring Method: (Power ON)
Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

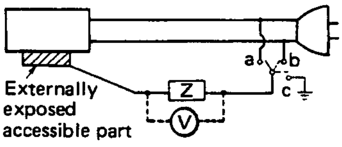


Fig. 9

5. **Grounding (Class I model only)**
Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).
Measuring Method:
Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

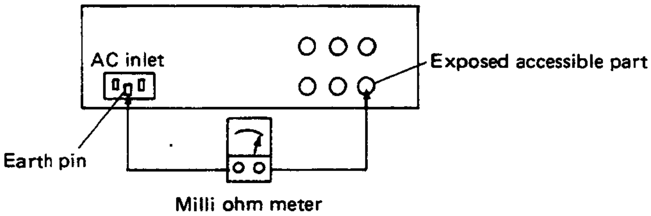


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	–	AC 900 V 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ /500 V DC	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

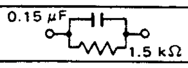
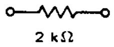
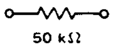
AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan		i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada		i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia		i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
			i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

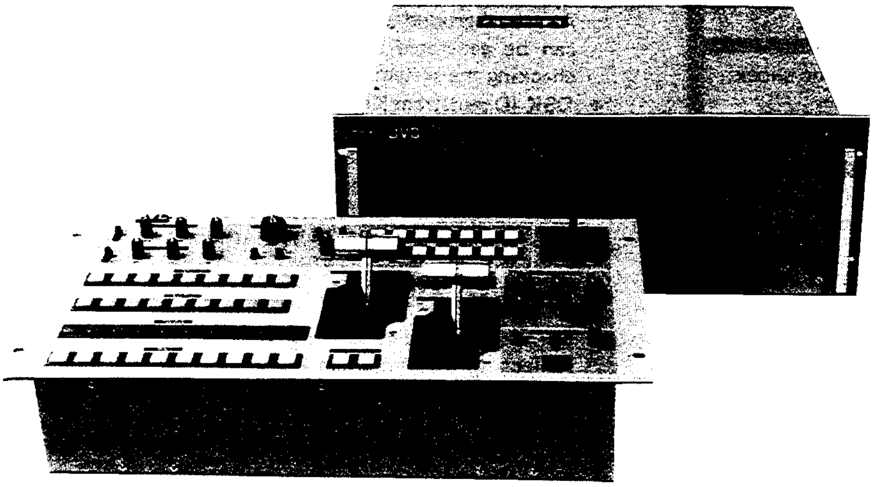
Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

JVC Instructions

COLOR SPECIAL EFFECTS GENERATOR

KM-2500



For Customer Use:
Enter below the Serial No. which is located on the rear panel. Retain this information for future reference.

Model No. KM-2500

Serial No.

Due to design modifications, the servicing procedures and data given in this manual are subject to possible change without prior notice.

WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

AVERTISSEMENT:

POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, NE PAS EXPOSER L'APPAREIL A L'HUMIDITE OU A LA PLUIE.

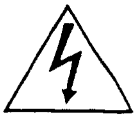
Warning Notice
FOR YOUR SAFETY

To ensure safe operation the three-pin plug supplied must be inserted only into a standard three-pin power point which is effectively grounded through the normal hausehold wiring.
Extension cords used with the equipment must be three-core and be correctly wired to provide connection to earth ground. Wrongly wired extension cords are a major cause of fatalities.
The face that the equipment operates satisfactorily does not imply that the power point is properly grounded and that the installation is completely safe. For your safety, if in any doubt about the correct grounding of the power point, consult a qualified electrician.

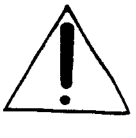
— U version —

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with arrowhead symbol, within an equilateral triangel, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to consitute a risk of electric shock to persosn.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

— for E version —

WARNING – THIS APPLIANCE MUST
BE EARTHED
IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

GREEN-AND-YELLOW: EARTH
BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows. The wire which is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug which is marked with the letter E or by the safety earth sumbol ⏚ or coloured GREEN or GREEN-AND-YELLOW. The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

FEATURES

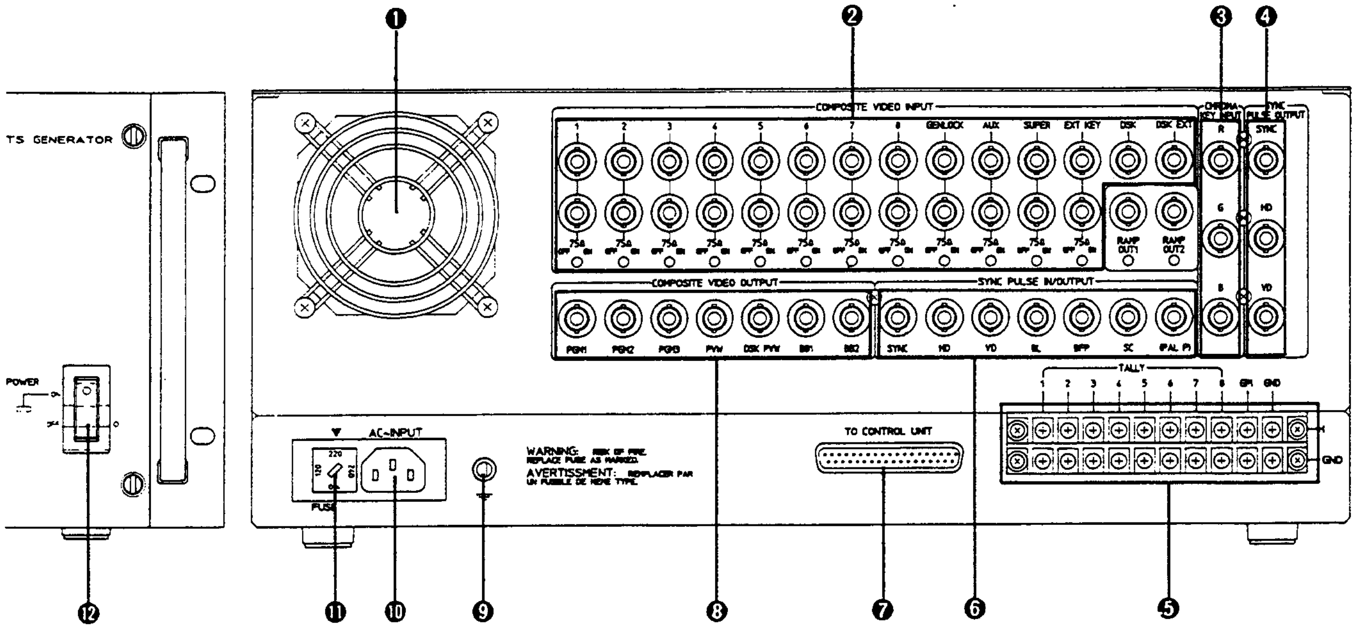
- **MULTI-INPUT, MULTI-FUNCTION**
  Eight inputs, four buses and two fader levers for a wide range of effects.
- **WIPE PATTERN SELECTION**
  13 Wipe patterns with soft wipe, border wipe, and positioner (round, diamond and window) functions, for effective wipes.
- **CHROMA KEY GENERATOR**
  The built-in RGB chroma key generator makes possible chroma keying without using any external equipment. External keying is also possible via the EXT Key input terminals.
- **AUTO TRANSITION FUNCTION**
  The operations of fader lever and DSK ON/OFF switch can be performed by one-touch operation. The timing with which effects are performed can be set up and the effects performed by simply pressing a button.
- **FLIP-FLOP MIX CIRCUIT**
  Regardless of the position in which the fader lever is located, program outputs are selected by buttons directly; by operation of the MIX lever, the program and preset buses alternate with each other.
- **COLOR BACKGROUND GENERATOR**
  Any background color can be created. A color bars signal can be generated by the built-in color bars generater for checking the system.
- **DSK (Downstrem Keyer)**
  The DSK has a switch for the selection of the polarity of the input signals (NEGA/POSI), an edge function, a coloring function and a function to insert fill video.
- **NON-LOCKED SIGNAL INPUT (AUX)**
- **SSG WITH GENLOCK FUNCTION**

PRECAUTIONS

- For an extended service life, avoid using the unit in a place subject to extreme temperatures, high humidity, strong vibrations excessive dust, or in a place near the source of noise.
- Avoid strong vibrations and shocks when installing or carrying.
- Do not apply strong force to the fader lever or handle it violently.
- The standard positioning of the control panel is horizontal. Never lean it by more than 45° from the horizontal.

CONTROLS, CONNECTORS AND INDICATORS

MAIN UNIT


❶
❷
❸
❹
TS GENERATOR
POWER
ON
OFF
COMPOSITE VIDEO INPUT
1
2
3
4
5
6
7
8
GENLOCK
AUX
SUPER
EXT KEY
DSK
DSK EXT
75Ω
OFF ON
RAMP OUT1
RAMP OUT2
CHROMA-KEY INPUT
R
G
B
SYNC PULSE OUTPUT
SYNC
HD
VD
COMPOSITE VIDEO OUTPUT
PGM1
PGM2
PGM3
PVW
DSK PVW
BB1
BB2
SYNC PULSE IN/OUTPUT
SYNC
HD
VD
BL
BFP
SC
(PAL P)
TALLY
1
2
3
4
5
6
7
8
GPI
GND
GND
AC-INPUT
120
220
240
FUSE
WARNING: RISK OF FIRE. REPLACE FUSE AS MARKED.
AVERTISSMENT: REMPLACER PAR UN FUSIBLE DE MEME TYPE.
TO CONTROL UNIT
⓬
⓫
❿
❾
❽
❼
❻
❺

❶ Ventilator
There is a cooling fan inside. Always allow sufficient space.

❷ COMPOSITE VIDEO INPUT connectors

1–8	: These allow bridged connection of input video signals. If bridged connection is not used, set the 75 ohm termination switches to "ON".
GENLOCK	: The KM-2500 will be genlocked to the composite video signal input to this.
AUX	: Supply a video signal from a non sync locked video source.
SUPER	: Supply a video signal to be superimposed.
EXT. KEY	: Supply a video signal fo external keying.
DSK	: Supply a key signal for DSK.
DSK EXT	: Supply a key fill signal for DSK.

❸ CHROMA KEY INPUT connectors (R, G, B, without sync)
Supply R, G, B, video signals for chroma keying.

❹ SYNC PULSE OUTPUT connectors
BNC 75-ohm output. Used by black & white camera for superimpose and DSK (SYNC, HD and VD external sync available).

❺ TALLY output/GPI input terminals

TALLY 1–8 : Tally signl output terminals, coupled with remote control tally line. (Voltage feed: 5VAC, 10 mA MAX)

GPI (General Purpose Interface): Accepts external control signals to control auto transition functions ㉖, used for A/B roll editing, etc.

❻ SYNC PULSE IN/OUT connectors
These connectors are set to the input or output mode by the sync mode change-over switches inside the main unit. When delivered from the factory, they are set as output connectors. When using EXT PULSE DRIVE mode, it is necessary to switch from output connectors to input connectors.
For details, refer to page 8.

❼ TO CONTROL UNIT connector
Connect to the control unit with the provided cable.

❽ COMPOSITE VIDEO OUTPUT connectors

PGM 1–3	: Output the video signals processed by the program in the main unit.
PVW	: Preview output connector. Used for monitoring the next video to be output for preparation and checking.
DSK PVW	: Preview output connector for DSK. By monitoring this output, the downstream keyer (slice level, HUE, SAT, LUM etc.) can be set up without being inserted into the PGM line.
BB1, 2	: Black Burst signal output.

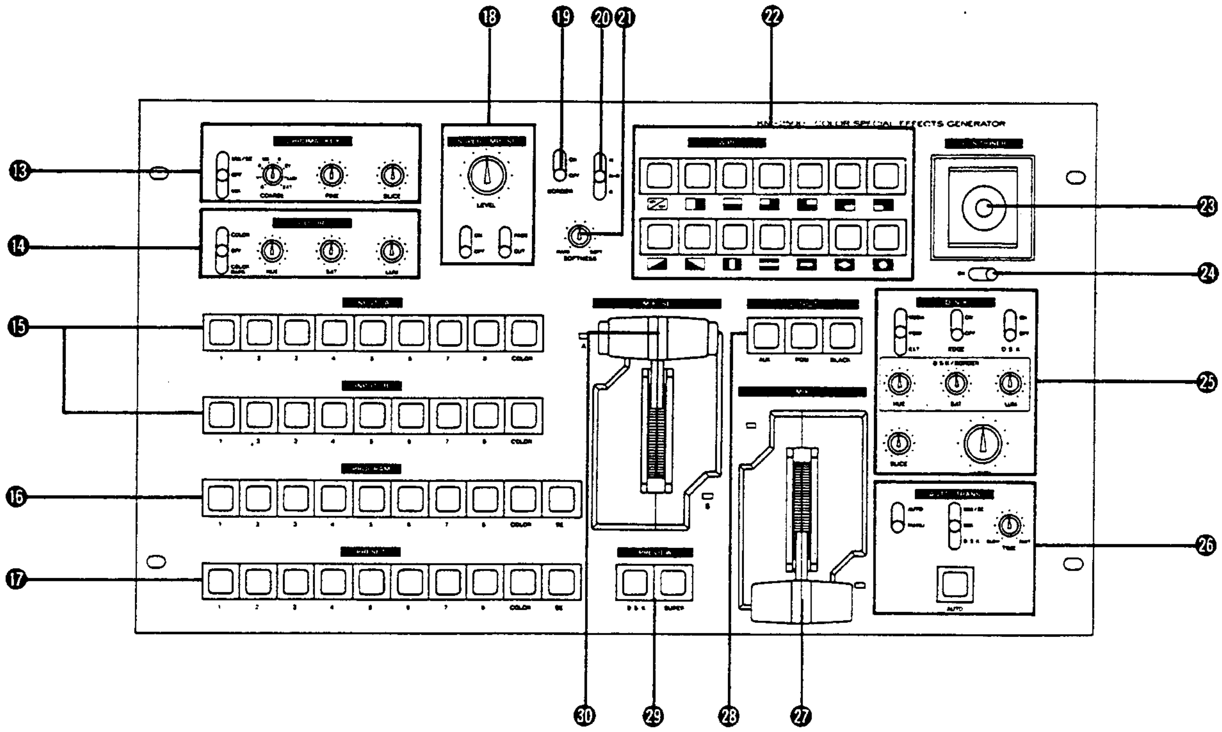
❾ GND terminal
For grounding the entire system. To prevent malfunctions due to noise, ground the connected equipment and racks to the chassis.

❿ AC INPUT socket
Connect to an AC outlet with the provided power cord.

⓫ Line voltage selector
Set to correspond to the local line voltage. If set incorrectly, operations will be impossible. If the incorrect voltage is supplied, internal components could be damaged.

⓬ POWER switch (ON/OFF)
Switch to turn the power of the main and control units ON and OFF.

CONTROL UNIT



⑬ CHROMA KEY (Chroma key section)
These control the chroma key effects using R,G,B signals and the external key effect with the signal from an external black & white camera. They select the keying effect to be performed with the MIX/SE lever or with the MIX lever, the condition of keying and hue adjustment in the chroma key mode. For details, refer to "DESCRIPTION OF AVAILABLE FUNCTIONS", page 15.

⑭ COLOR (Color section)
This function can be used to fill the entire picture with the background color. Any background color can be chosen, including black and white. This also enables color bars signal output. The signals formed in this section are output to the COLOR buttons of each bus line. For details, refer to "DESCRIPTION OF AVAILABLE FUNCTIONS", page 14.

⑮ INPUT A, INPUT B (A bus line, B bus line)
Bus lines for selecting inputs to the effects circuit using the MIX/SE lever. There are 8 video signal inputs plus the signal formed in the COLOR (color background) generating circuit, totaling 9 inputs that can be selected. To select any input, press the corresponding button, and its lamp will light.

⑯ PROGRAM (Program bus line)
Bus line for selecting the video to be supplied to the PROGRAM output connectors ⑧ . There are 8 video signal inputs, COLOR (color background), SE (signal from MIX/SE lever), so a total of 10 signals can be selected. Press any button to select the required signal, and its lamp will light.

⑰ PRESET (Preset bus line)
Bus line for selecting the video source to stand by to be output to the PGM line next using the MIX lever.

⑱ SUPERIMPOSE (superimpose section)
The video signal input to SUPER on the rear of the main unit is inserted into the output of the effects circuit by operation of the MIX lever.

LEVEL : Level adjustment control. Varies the level of the video signal to find the most natural insertion point.
ON/OFF : On/off switch. To switch the superimpose function on/off.
FADE/CUT: FADE; When superimpose is switched on, the video signal is inserted gradually.
CUT; When superimpose is switched on, the video signal is inserted instantly.

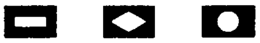
⑲ BORDER (Border ON/OFF switch)
Switch to insert a border between the A and B bus images during wipes.

⑳ N/N-R/R (Normal/reverse change-over switch)
Switch to alter the direction of the wipe. For details, refer to "DESCRIPTION OF AVAILABLE FUNCTIONS", page 13.

㉑ SOFTNESS (Soft/Hard control)
The edges become sharp when the knob is turned in the direction of HARD, and they become soft when the knob is turned in the direction of SOFT during wipes. When the BORDER switch set to ON, the soft border can be available by this knob.

㉒ WIPE buttons (MIX/KEY and wipe pattern selection switches)
These buttons select the mix and keying operations to be performed by the effects circuit using the MIX/SE lever, and select the wipe pattern in wipe operations.

㉓ **POSITIONER (Positioner lever)**
When the effects circuit is used in the wipe mode with the MIX/SE lever, and POSITIONER switch ㉔ is ON, the position of the following three wipe patterns can be moved to any part of the screen with the positioner lever.



㉔ **POSITIONER ON/OFF switch**
Switch to turn the POSITIONER lever ㉓ ON and OFF.

㉕ **DSK (Downstream keyer section) (including border color control)**
This section controls the keying of the output signal from the effects circuit using MIX lever operation when a DSK signal is input.
In addition to coloring, edge, negative/positive reversal of the DSK key signal, the video signal input to DSK EXT input connector ② can be inserted as a fill.
When the border effect is on in the wipe mode, the border color can be controlled. Coloring the DSK and border is performed using the same controls, so when both functions are in use, the colors of each are complementary.
For details, refer to "DESCRIPTION OF AVAILABLE FUNCTIONS", page 17.

㉖ **AUTO TRANS (Auto transition section)**
This section controls the video signal output on the program bus; the next video stands by to be output to the PGM line, and the switch allows transition from one to the other by a one-touch operation. For details, refer to "DESCRIPTION OF AVAILABLE FUNCTIONS", page 18.

㉗ **MIX (Mix lever)**
This lever changes the mix of the video signals selected on the program bus line and preset bus line.
For operation, refer to page 12.

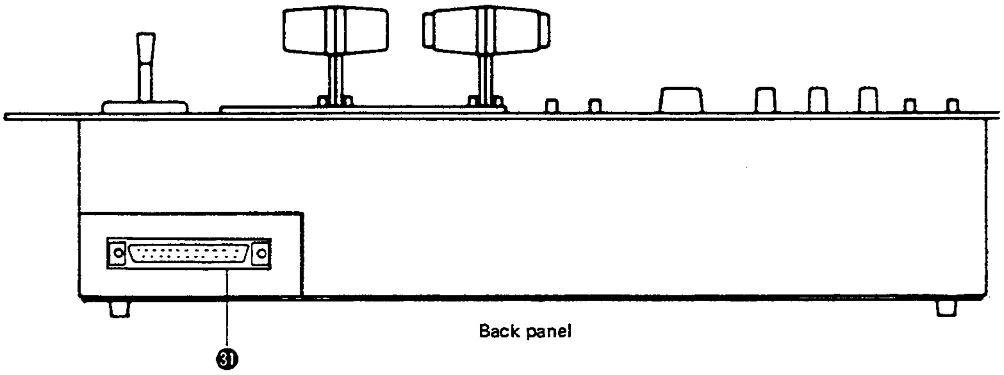
㉘ **OUTPUT buttons (Output selection) (with auto fade function)**
Buttons for final selection of signals to be output to the PGM 1~3 output connectors. Three selections are available, as follows.

AUX	: Video signal input to the AUX connector on the rear panel of main unit is output.
PGM	: Video signal processed by the effects function is output.
BLACK	: Black signal is output.

㉙ **PREVIEW (Preview output selection)**
Images with the DSK and SUPER effects are selected without affecting the PGM line, and output to the PREVIEW output connectors.
The DSK and SUPER buttons are non-locking. When they are pressed once, they are switched ON, and when they are pressed again, they are switched OFF.
When neither the DSK nor SUPER button is lit, the PRESET bus line is selected. When the DSK or SUPER effect is performed on the on air line (PGM), even if the buttons are pressed, neither function can be selected.

㉚ **MIX/SE (Mix/Wipe lever)**
Mixing of video signals selected by A bus and B bus lines, and wipe effects are perfromed with this lever. If MIX/KEY is selected in the WIPE section, it controls the mixing ratio, and if a wipe is selected, it controls the wipe. The lock button is used to lock and unlock the left and right parts of the MIX/SE lever.

㉛ **TO MAIN UNIT connector**
For connection to the main unit using the provided cable.



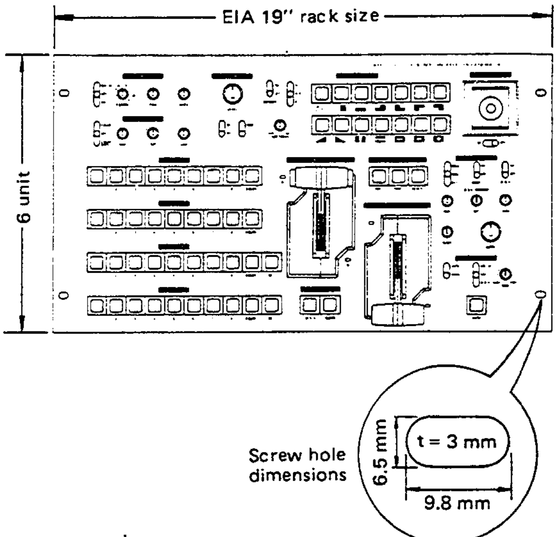
Back panel

INSTALLATION

Screws are not provided. Obtain appropriate screws.

Installation of the Control Unit (into a control console, for example)
Refer to the drawing on the right.

Notes:
- The standard operating position of the control unit is horizontal. Do not install it at an angle greater than 45°, otherwise the position of the FADER lever cannot be identified.
- Do not attempt to lift the control unit by the FADER lever.


EIA 19" rack size
6 unit
Screw hole dimensions
6.5 mm
t = 3 mm
9.8 mm

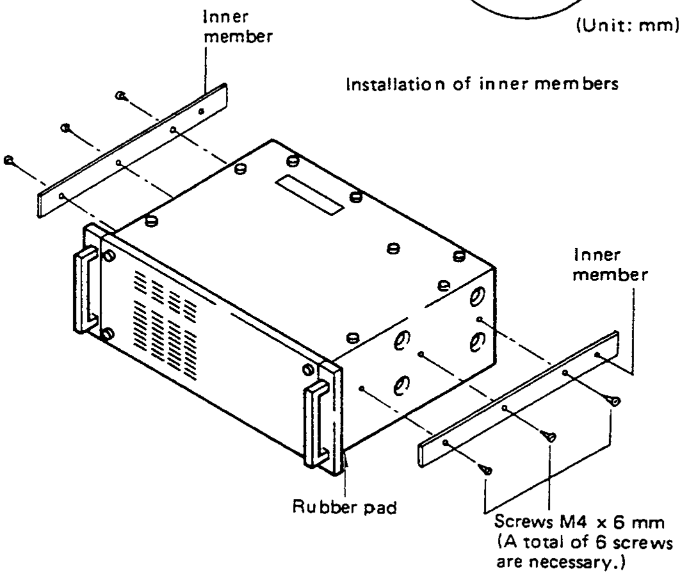
(Unit: mm)

Installation of the Main Unit (in a rack, for example)
The main unit can be installed in an EIA 19" rack using the threaded holes in its sides.
1. Remove the four screws retaining the rubber pads.
2. Attach the inner members (optional) of the slide rails on both sides of the main unit.
3. Attach the outer members (optional) of the slide rails to the rack. Then install the main unit into the rack.

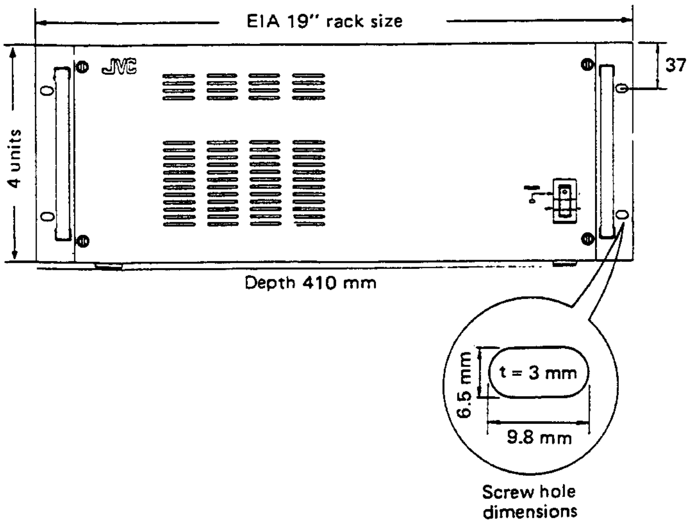
Applicable slide rails

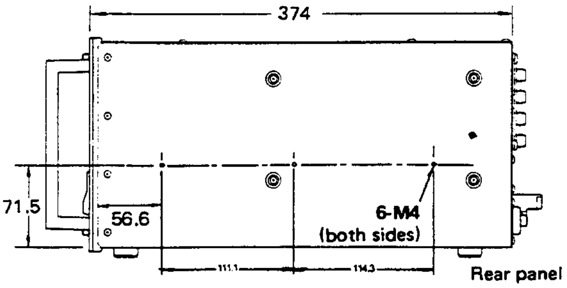
Model	Manufacturer	Slide length
C-305-20	Accuride Co., Ltd.	508 mm (20")

Note:
For installation of the outer members into the rack, consult the dealer from whom you bought the slide rails or rack.


Inner member
Inner member
Rubber pad
Screws M4 x 6 mm
(A total of 6 screws are necessary.)

Installation of inner members


EIA 19" rack size
37
4 units
JVC
Depth 410 mm
t = 3 mm
6.5 mm
9.8 mm
Screw hole dimensions


374
71.5
56.6
6-M4
(both sides)
111.1
114.3
Rear panel

Inner member mounting hole positions

(Unit: mm)

CONNECTIONS

■ Connection of the control unit to the main unit

Connect the connectors of the control unit and main unit using the cable provided.

■ System connection example

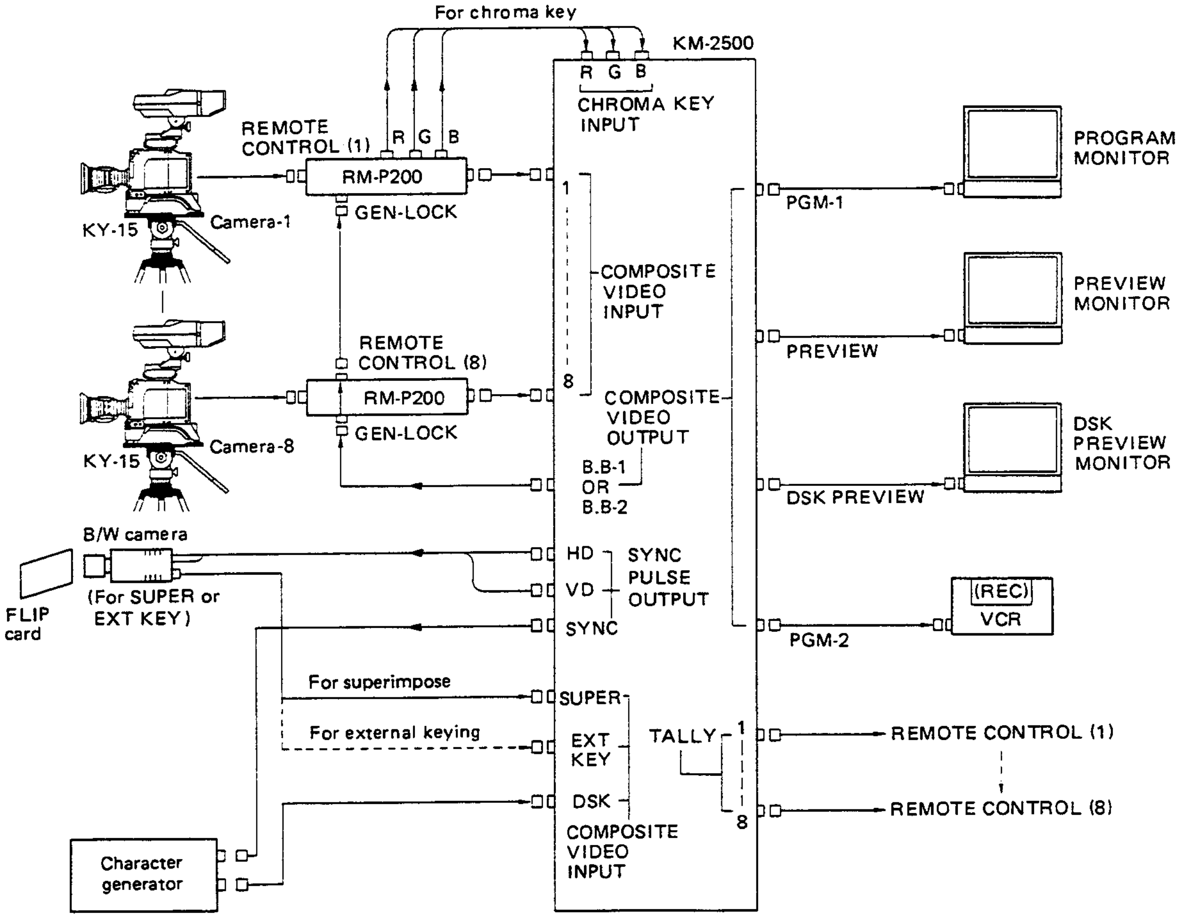
For KM-2500 to operate correctly, the whole system should be genlocked. There are three ways to genlock; the INT mode, the GENLOCK mode, and the EXT pulse drive mode and each mode uses a different connection.

1. INT mode

In this mode, the whole system is locked to the sync signals from the SSG in the KM-2500.

Sync signals should be supplied to all input signal sources from the KM-2500.

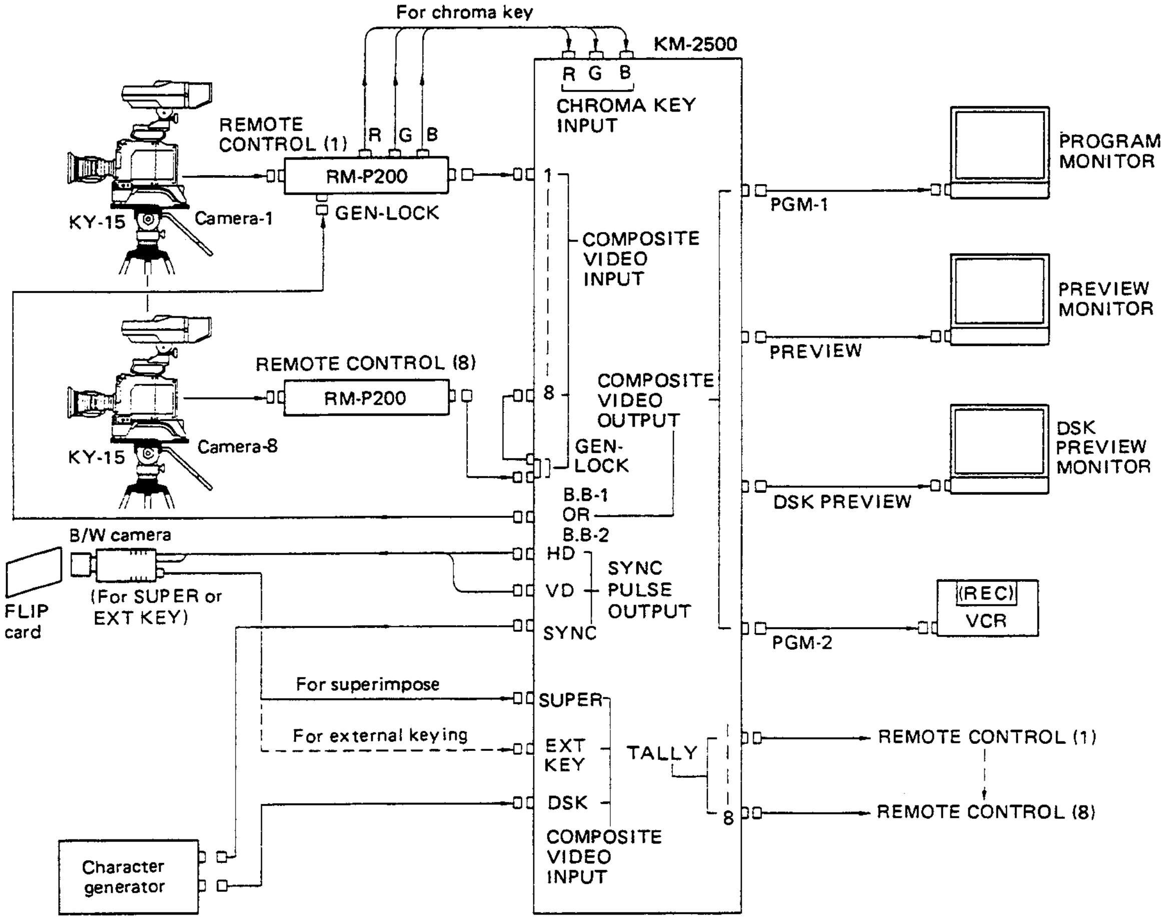
Note:
- If a non-signal channel is selected for the A bus line, the SE output on the preview monitor will not be synchronized correctly. To avoid this phenomenon, input a B.B. signal from the main unit into any of inputs C1 – C8 which has not yet been connected.
- The chroma keying and external keying cannot be operated at the same time.
- Video tape playback signals contain considerable jitters and dropouts. When applying special effects to these signals, use a TBC (Time Base Corrector).
- The 75-ohm termination swtiches of all input connectors which are not connected should be set to "ON".


For chroma key
KM-2500
R G B
CHROMA KEY INPUT
REMOTE CONTROL (1)
R G B
RM-P200
GEN-LOCK
KY-15
Camera-1
REMOTE CONTROL (8)
RM-P200
GEN-LOCK
KY-15
Camera-8
1
8
COMPOSITE VIDEO INPUT
COMPOSITE VIDEO OUTPUT
B.B-1 OR B.B-2
B/W camera
(For SUPER or EXT KEY)
FLIP card
HD
VD
SYNC PULSE OUTPUT
SYNC
For superimpose
For external keying
SUPER
EXT KEY
DSK
COMPOSITE VIDEO INPUT
TALLY
1
8
Character generator
PROGRAM MONITOR
PGM-1
PREVIEW MONITOR
PREVIEW
DSK PREVIEW MONITOR
DSK PREVIEW
(REC)
VCR
PGM-2
REMOTE CONTROL (1)
REMOTE CONTROL (8)

2. GENLOCK mode

In this mode, the whole system is genlocked to an external composite video or black burst signal.
The following illustration is an example of using the signal from camera-8 as the external sync signal.

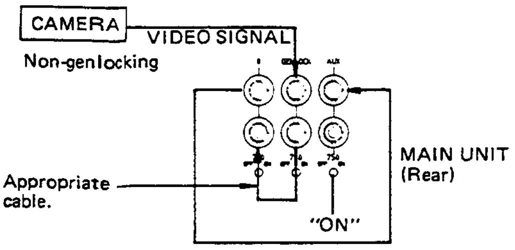
In this case, the signal of camera-8 is used both as the sync signal and input-8 image signal.
In this mode, color video cameras without a genlock function, or other signal sources (ex. ON-AIR) can be combined with this system and their images can be used.



For chroma key
KM-2500
R G B
CHROMA KEY INPUT
REMOTE CONTROL (1)
R
G
B
RM-P200
GEN-LOCK
KY-15
Camera-1
1
COMPOSITE VIDEO INPUT
PROGRAM MONITOR
PGM-1
PREVIEW MONITOR
PREVIEW
REMOTE CONTROL (8)
RM-P200
8
COMPOSITE VIDEO OUTPUT
GEN-LOCK
KY-15
Camera-8
DSK PREVIEW MONITOR
DSK PREVIEW
B.B-1
OR
B.B-2
B/W camera
HD
VD
SYNC
SYNC PULSE OUTPUT
(REC)
VCR
PGM-2
FLIP card
(For SUPER or EXT KEY)
For superimpose
SUPER
For external keying
EXT KEY
TALLY
REMOTE CONTROL (1)
DSK
8
REMOTE CONTROL (8)
COMPOSITE VIDEO INPUT
Character generator

Note when genlocking with the image input signal:
As in the above illustration of connecting GENLOCK input connectors and video input connectors (input-8), coaxial cable (40 cm) should be used. If longer cables are used, the SC. PHASE, H. PHASE of the KM-2500 should be adjusted as follows:

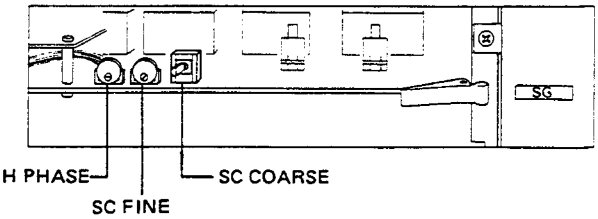
1. Connect the input-8 connector and AUX input connector with a coaxial cable with a length of less than 50 cm.



CAMERA
VIDEO SIGNAL
Non-genlocking
MAIN UNIT (Rear)
Appropriate cable.
"ON"

(Less than 50 cm)

2. Loosen four screws at the front of the main unit, and open the front cover.
3. Designate the camera to be used for the GENLOCK input on A bus line, and to output the video via the PGM output connector; choose "PGM" among the OUTPUT selection buttons and set the two fader levers as required.
4. Alternately depress the "PGM" and "AUX" OUTPUT selection buttons to adjust the H.PHASE on the KSG board (botton) so the picture does not move to the left or right and to adjust the SC. PHASE so that the colors match.

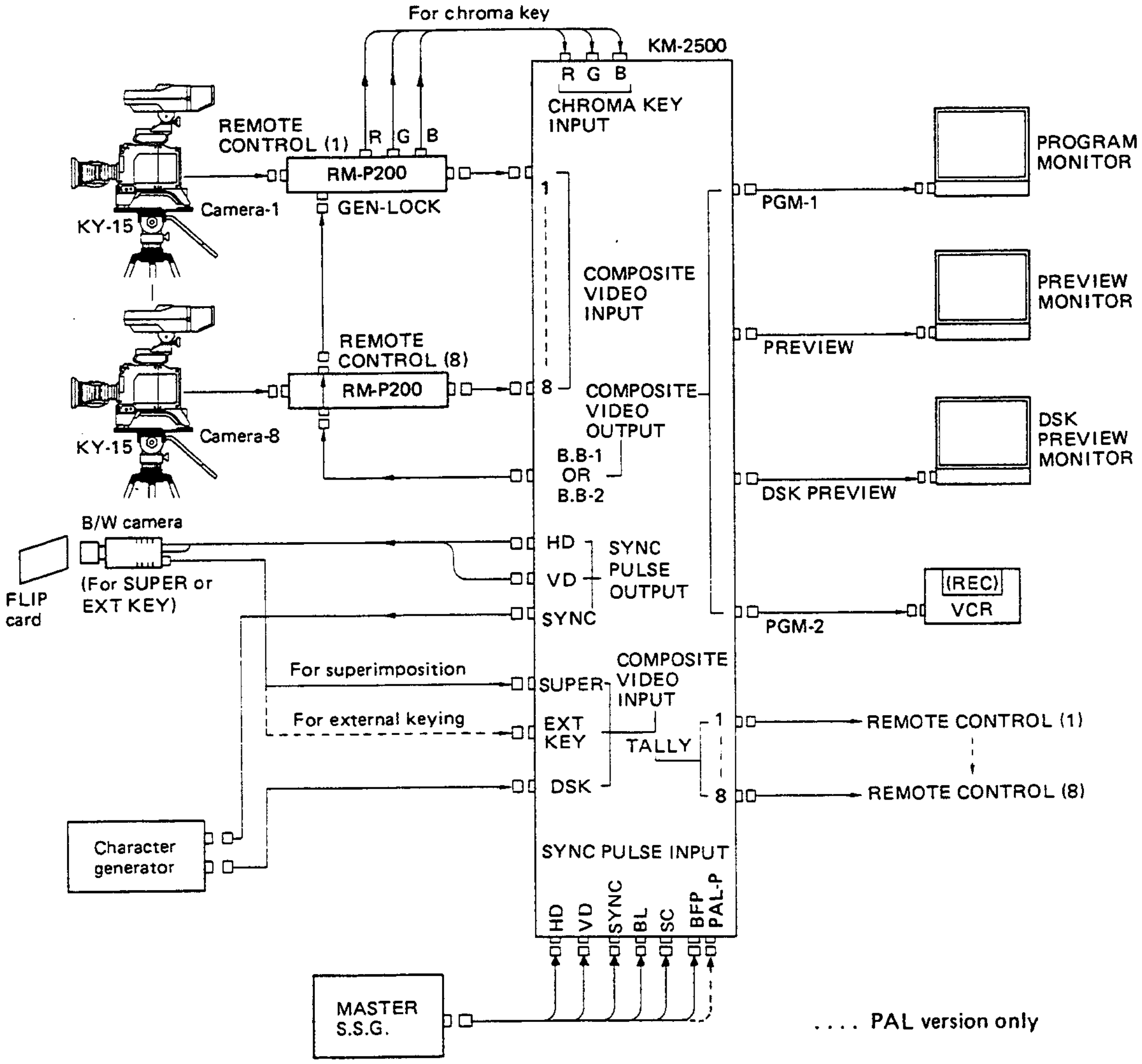


SG
H PHASE
SC COARSE
SC FINE

If you have a vectorscope or waveform monitor, connection "1" is unnecessary and after the preparations in steps 2 and 3, adjust the SC and H phases of the signals at the PVW and PGM output connectors.

3. EXT PULSE DRIVE MODE

In this mode, the whole system is locked to the drive pulse from the external SSG.


For chroma key
KM-2500
R G B
CHROMA KEY INPUT
REMOTE CONTROL (1)
R G B
RM-P200
GEN-LOCK
Camera-1
KY-15
COMPOSITE VIDEO INPUT
1
8
REMOTE CONTROL (8)
RM-P200
Camera-8
KY-15
COMPOSITE VIDEO OUTPUT
B.B-1 OR B.B-2
B/W camera
FLIP card
(For SUPER or EXT KEY)
HD
VD
SYNC
SYNC PULSE OUTPUT
For superimposition
For external keying
SUPER
EXT KEY
DSK
COMPOSITE VIDEO INPUT
TALLY
1
8
Character generator
SYNC PULSE INPUT
HD
VD
SYNC
BL
SC
BFP
PAL-P
MASTER S.S.G.
PROGRAM MONITOR
PGM-1
PREVIEW MONITOR
PREVIEW
DSK PREVIEW MONITOR
DSK PREVIEW
(REC) VCR
PGM-2
REMOTE CONTROL (1)
REMOTE CONTROL (8)
.... PAL version only

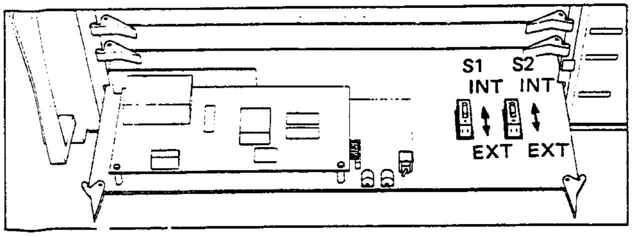
Note on connection:

When delivered from the factory, the sync pulse input/output connectors (SYNC PULSE IN/OUT) are set as output connectors.

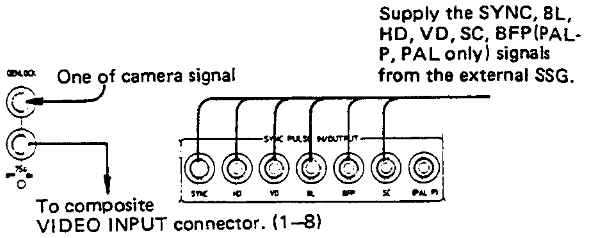
When using this mode, it is necessary to switch them from output terminals to input terminals.

The following illustrates how to change over.

1. Open the front panel of the main unit, and confirm two switches (INT/EXT), S1 and S2 on the SG board (bottom) to EXT.

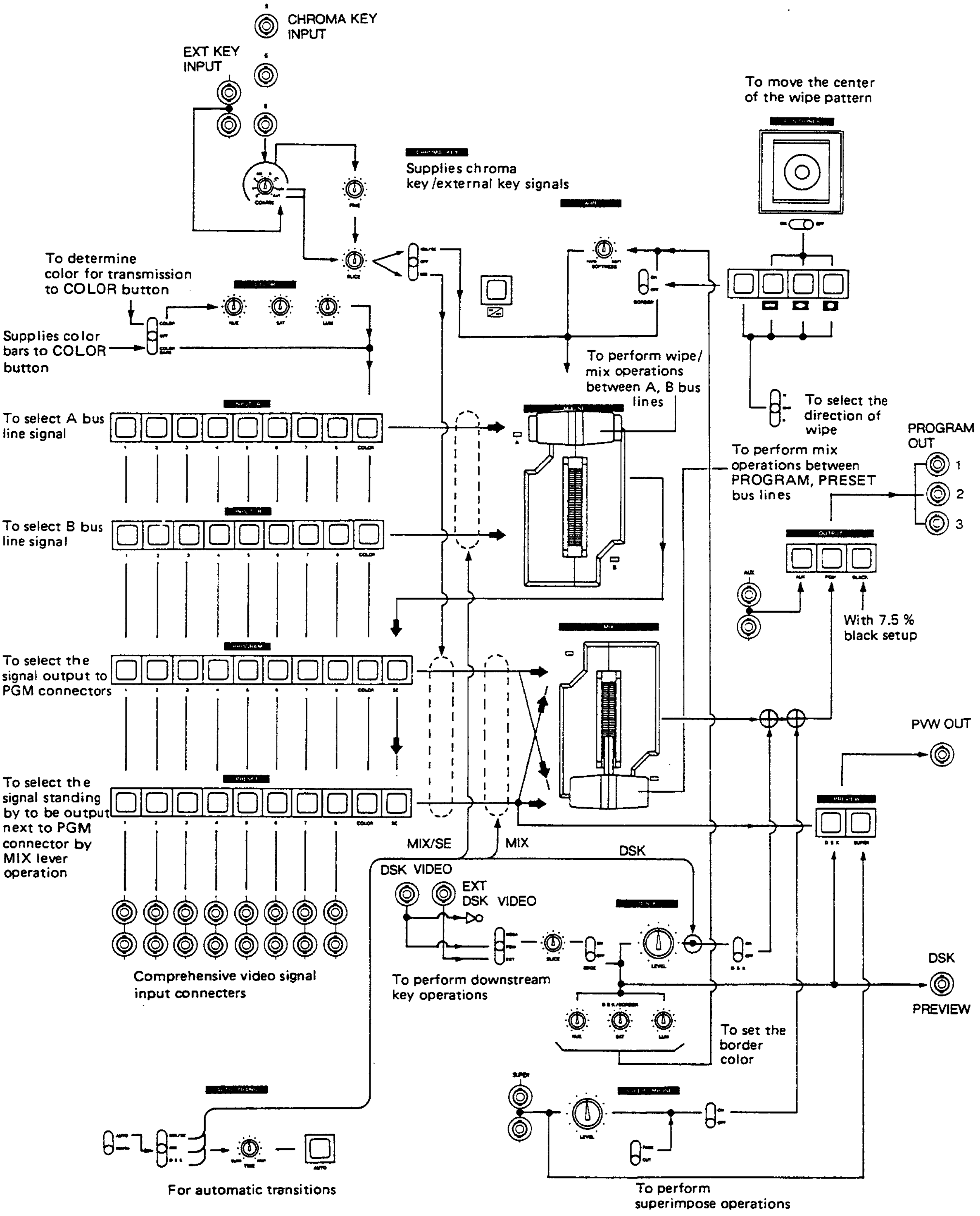

S1 S2
INT INT
EXT EXT

2. As shown in the following illustration, supply SYNC, BL, HD, VD, BFP, PAL-P(PAL only) (4Vp-p negative), SC(2 Vp-p) signals. And the signal from one of the inpt cameras must be fed to the KM-2500 through the GENLOCK terminals.


Supply the SYNC, BL, HD, VD, SC, BFP(PAL-P, PAL only) signals from the external SSG.
One of camera signal
SYNC PULSE IN/OUT
SYNC HD VD BL BFP SC PAL-P
To composite VIDEO INPUT connector. (1–8)

After these steps, the main unit is synchronized with the signal from the external SSG.

■ Operation diagram:


CHROMA KEY INPUT
EXT KEY INPUT
Supplies chroma key /external key signals
To move the center of the wipe pattern
To determine color for transmission to COLOR button
Supplies color bars to COLOR button
To perform wipe/ mix operations between A, B bus lines
To select the direction of wipe
To select A bus line signal
To perform mix operations between PROGRAM, PRESET bus lines
PROGRAM OUT
1
2
3
To select B bus line signal
With 7.5 % black setup
To select the signal output to PGM connectors
PVW OUT
To select the signal standing by to be output next to PGM connector by MIX lever operation
MIX/SE
MIX
DSK
DSK VIDEO
EXT DSK VIDEO
Comprehensive video signal input connecters
To perform downstream key operations
DSK
PREVIEW
To set the border color
For automatic transitions
To perform superimpose operations

PREPARATIONS

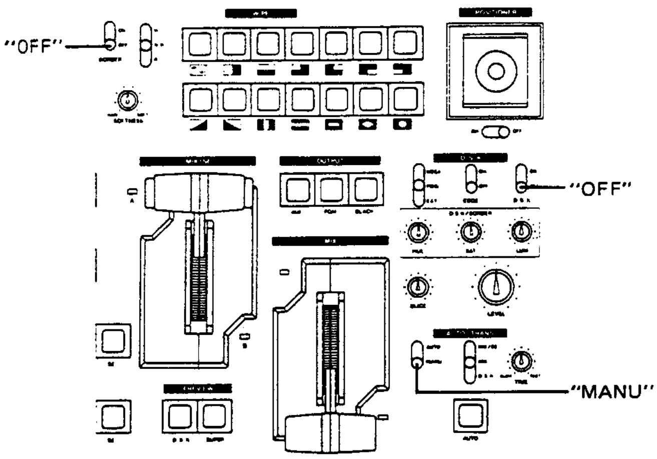
■ System adjustments

After making connections, it is necessary to perform this "system adjustment" as the signal levels and phases are not matched between the individual units making up the system. Only a simplified adjustment procedure is described here. The adjustment is more precise when a vectorscope and waveform monitor are connected to the PGM and PREVIEW outputs.

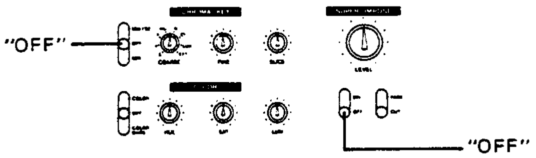
1 Supply power to all connected equipments.
When the power switch of the main unit is on, the A, B, PROGRAM and PRESET bus lines are set to "1", WIPE is set to "MIX/KEY" and OUTPUT is set to "PGM" automatically.

2 Set the BARS switch of a connected color video camera to "ON" and color bars will appear in the picture.

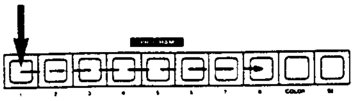
3 Set buttons and levers on the control panel of the main unit to the following conditions:
- Move the MIX/SE lever fully to the A bus side.
- Move the MIX lever fully to the top.
- Set the DSK ON/OFF switch to OFF.
- Set the AUTO/MANU switch in the AUTO TRANS section to MANU.
- Set the BORDER switch to OFF.



- Set the superimpose ON/OFF switch to OFF.
- Set the mode selection switch in the CHROMA KEY section to OFF.

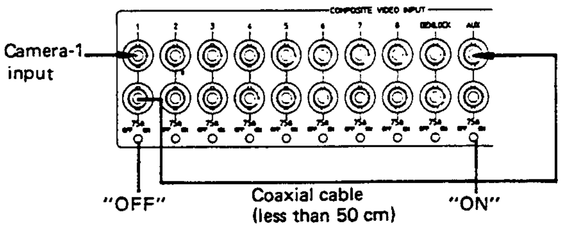


4 Confirm that color bars from each camera are input by viewing the PROGRAM monitor, changing over the button of PROGRAM bus line.

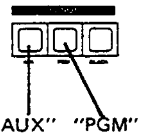


5 Adjust the H phase and color SC phase of camera-1.

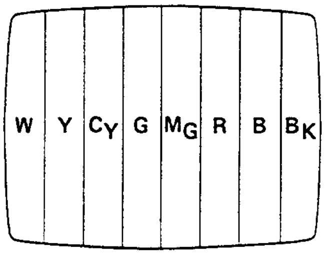
(1) Set the 75-ohm termination switch of the camera-1 input connector to OFF, and connect the through output connector and the AUX connector with coaxial cable with a maximum length of 50 cm.
(Set the 75-ohm termination switch of the AUX connector to ON.)



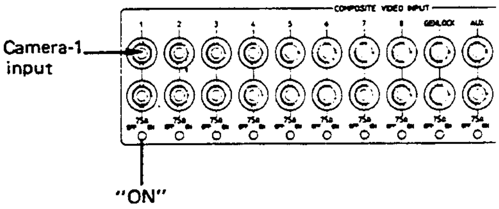
(2) Press the "PGM" and "AUX" OUTPUT selection buttons alternately.



Adjust the horizontal phase of camera connected to "1" if the image on the program monitor moves to the right or left, and in the same way, adjust the color phase (SC PHASE) on the camera so that the color bars pattern is in phase.



(3) After adjustment, reconnect camera-1.



6 Perform adjustment of other cameras (2 – 8) in the same way.

7 If several color video cameras are included in the system, shoot the same subject (gray scale, for example) with each and fine-adjust the black (pedestal) level, white level (video level) and chroma level, etc.

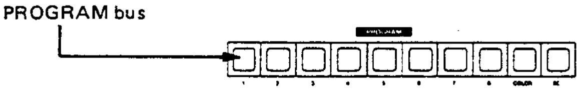
OPERATION

1. Picture switching operation (cuts)

The following two methods can be used to switch the PGM output by switching between cameras.

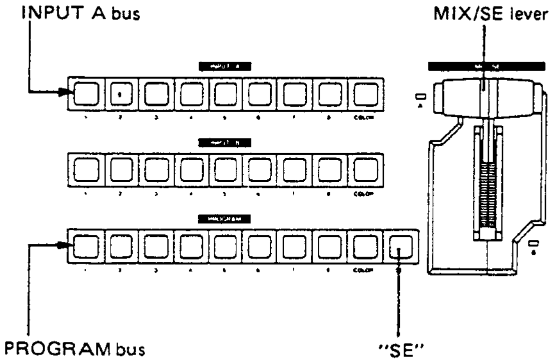
1. Switching

Press one of the buttons on the PROGRAM bus, and the selected video will be fed to the PGM output.



Normally, switching is done on the PROGRAM bus. However, depending on the selection on other buses and/or the setting of the MIX/SE and MIX levers, it is also possible to switch the PGM output on the INPUT A or B bus.

- Switching on the INPUT A bus
  Select SE on the PROGRAM bus and set the MIX/SE lever to the A bus position ("up" position).



In this condition, the INPUT A bus is selected as the PGM output, and the required video can be output simply by pressing the corresponding button on the INPUT A bus.

- Switching on the INPUT B bus
  Select SE on the PROGRAM bus and set the MIX/SE lever to the B bus position ("down" position).
  In this condition, the INPUT B bus is selected as the PGM output, and the required video can be output simply by pressing the corresponding button on the INPUT B bus.

2. Auto switching

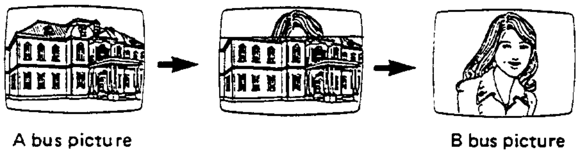
Automatic switching allows the picture selected in advance on the PRESET bus to be fed to the PGM output, using the controls in the AUTO TRANS section. For more details, refer to "AUTO TRANSITION" in "DESCRIPTION OF AVAILABLE FUNCTIONS, page 18.

2. Wipes

Wipes are special effects available by using the pictures selected on the INPUT A and B buses. Vertical and horizontal wipes are available.

- Set the MIX/SE lever to the A bus position.
- Select the required input on the INPUT A bus by pressing the corresponding button.
- Select SE on the PROGRAM bus.

1. Select the required wipe pattern. (▬ , for example)
2. Select the required input on the INPUT B bus which is to replace the A bus picture.
3. Slowly move the MIX/SE lever to the B bus position.



The A bus picture will be wiped away by the B bus picture.
By returning the MIX/SE lever from B to A, the B bus picture will be wiped away by the A bus picture.

Reference Information

- Different wipe effects are available depending on the selected wipe patterns. Select SE on the PRESET bus and first check the wipe effect on the preview monitor.
- Wipes are possible only with the MIX/SE lever, not the MIX lever.
- If the intended wipe effect is not obtained, it is possible that other effects are mixed because of the settings of other switches and controls. Check the following points:
  - The CHROMA KEY section is in operation (for details refer to page 15). Is the mode switch set to OFF?
  - The border wipe function is in operation (for details refer to page 14). Is the BORDER switch set to OFF?
  - The DSK section is in operation (for details refer to page 17). Is the DSK switch set to OFF?
  - The reverse wipe function is in operation (for details refer to page 13). Is the N/N-R/R switch set to N–R?
  - The wipe positioner function is in operation (for details refer to page 14). Is the POSITIONER switch set to OFF?

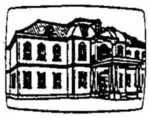
3. Mixes

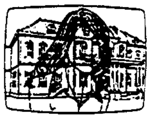
1. Mixing with the MIX/SE lever (Mixing of INPUT A and B buses)

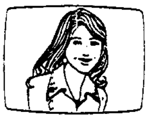
The A bus picture can be replaced by the B bus picture with effects such as overlap, dissolve, or color background fade-in/out.

- Set the MIX/SE lever to the A bus position.
- Select the required input on the INPUT A bus.
- Select SE on the PROGRAM bus.

1 Press the MIX/KEY button in the WIPE section.
2 Select the required input on the INPUT B bus which is to replace the A bus picture.
3 Slowly move the MIX/SE lever to the B bus position. The A and B pictures will be mixed and then changed to the B picture.


A bus picture

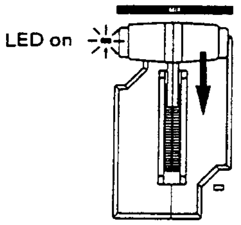

(Mixed pictures)

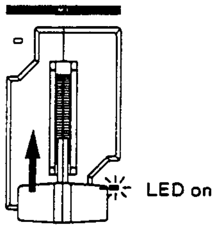

B bus picture

2. Mixing with the MIX lever (Mixing of PROGRAM and PRESET buses)

The same effects can be obtained with pictures from the PROGRAM and PRESET buses.

1 Select the required input on the PROGRAM bus.
2 Select the required input on the PRESET bus which is to replace the PROGRAM bus picture.
3 Slowly move the MIX lever toward the position at which the program output indicator LED is off. The pictures from the PROGRAM and PRESET buses will be mixed and changed to the PRESET bus picture.



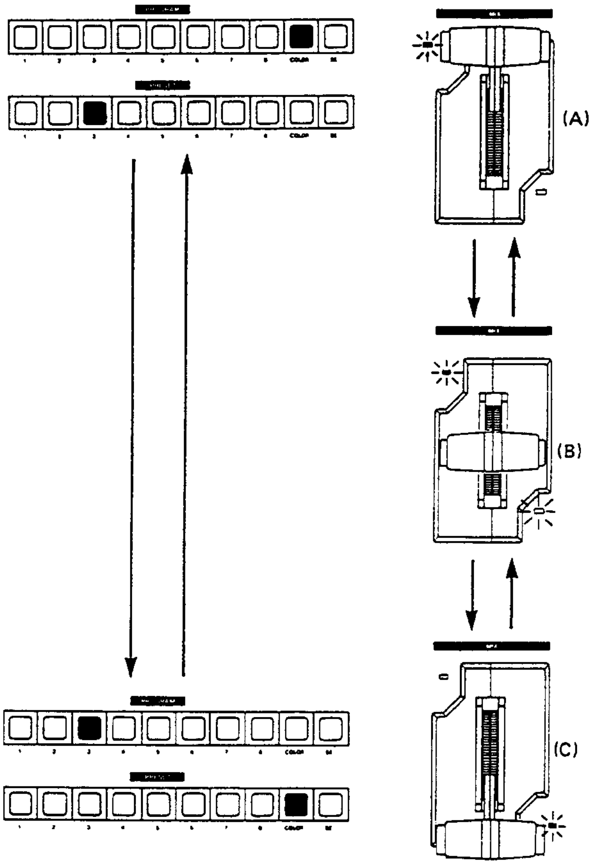


The MIX lever has a flip-flop function. The direction in which the lever is moved is determined by the previous setting of the lever.

Reference Information

- Flip-flop funtion of the MIX lever

As the MIX lever is operated, the LEDs to the sides of the lever and the illuminated buttons on the PROGRAM and PRESET buses change in the order of (A), (B), and (C) as shown below. This cycle is repeated every time the MIX lever is operated.
(Example: COLOR and input 3 are selected on the PROGRAM and PRESET buses, respectively.)



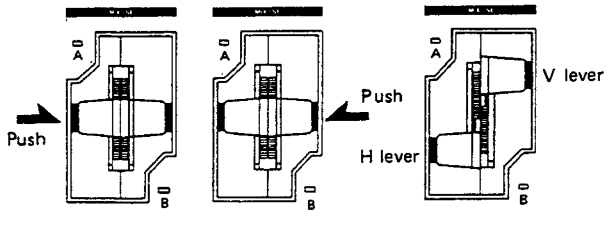
When the MIX lever is fully moved up or down, the PROGRAM bus is always selected and, with the MIX lever between its end points with both LEDs on, the pictures selected on the PROGRAM and PRESET buses are mixed, and finally the picture selected on the PRESET bus becomes the PROGRAM output. When only one LED is lit, only the PROGRAM bus is selected.
In (A), COLOR is fed to the PGM output, and in (C) input 3 is fed to the PGM output.

- By selecting SE on the PRESET bus, the mix effects available with the MIX/SE lever can be checked on the preview monitor. (If SE is selected on the PROGRAM bus, the PGM output changes instantaneously.)
- The mix effects available with the MIX lever cannot be previewed.

DESCRIPTION OF AVAILABLE FUNCTIONS

▪ MIX/SE lever

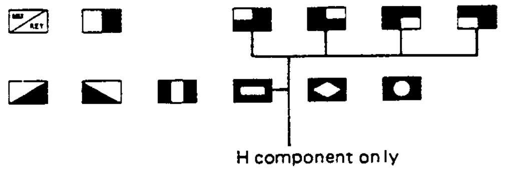
The MIX/SE lever consists of two parts (left and right) which can be coupled or decoupled by pressing the lock button on either part as illustrated below.


A
B
Push
Push
V lever
H lever

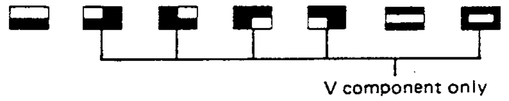
Coupled Independent

When decoupled, the H and V levers operate independently to control the H or V component of a wipe pattern.

- Patterns that can be controlled by the H lever

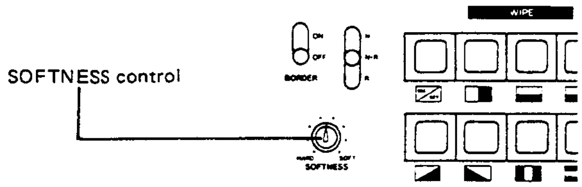

H component only

- Patterns that can be controlled by the V lever


V component only

▪ SOFTNESS control

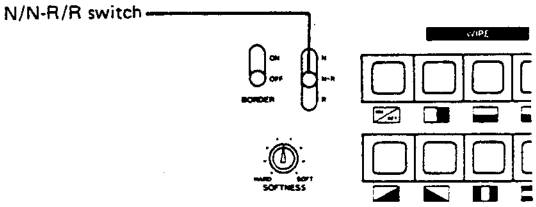
The SOFTNESS control varies the edges of the wipe pattern in A/B wipes. Setting this control to HARD defines the edges of the wipe pattern clearly; setting it to SOFT makes the edges softer by blending, thereby creating a more gentle transition.

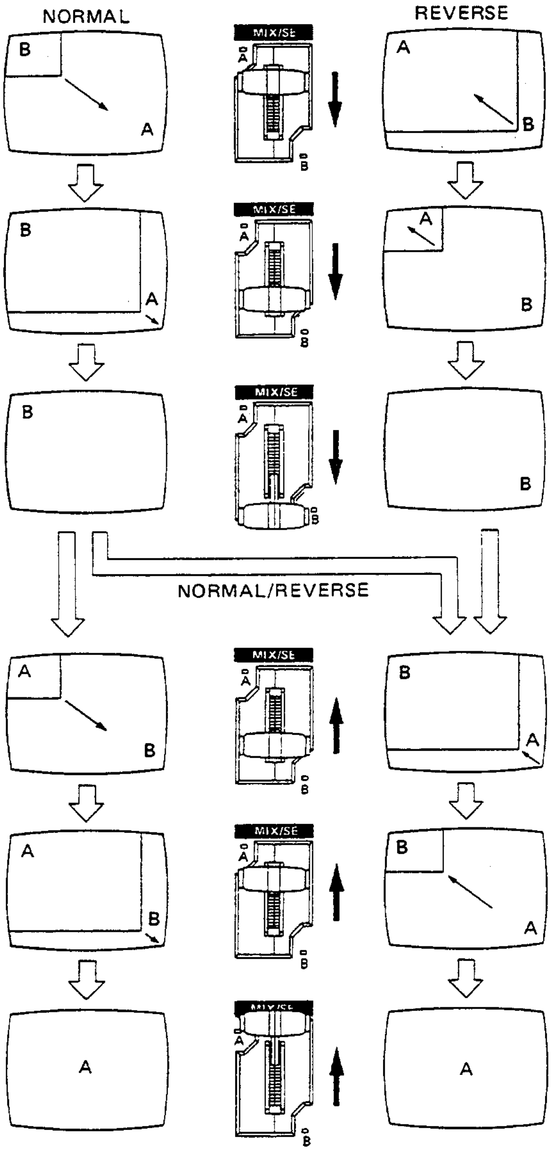

SOFTNESS control
WIPE
BORDER
SOFTNESS

▪ Wipe direction control (N/N-R/R switch)

The wipe conditions (size, position and angle) vary as the MIX/SE lever is operated. However, the direction of the wipe is determined by the setting of the N/N-R/R switch. When the N/N-R/R switch is set to N (Normal), the wipe always takes place in the same direction (from left to right, or from center to corner) regardless of the direction in which the lever is moved. (The lever must be fully moved to either end.)

When the N/N-R/R switch is set to R (Reverse), the wipe takes place in the reverse direction (from right to left, or from corner to center). In the N-R position, normal and reverse wipes alternate each time the MIX/SE lever is moved fully to either end.

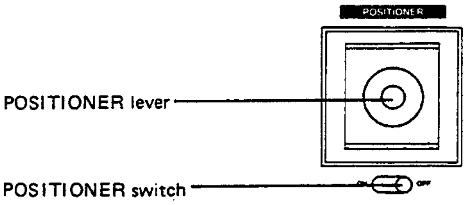

N/N-R/R switch
WIPE
BORDER
N
N-R
R
SOFTNESS


NORMAL
REVERSE
MIX/SE
A
B
NORMAL/REVERSE

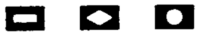
Note:
Be sure to select a wipe pattern with the MIX/SE lever fully moved to either end, otherwise the direction of the wipe cannot be specified.

■ POSITIONER section

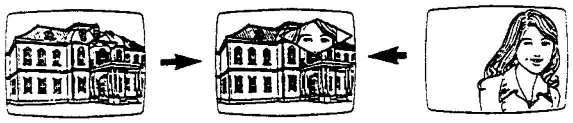
The center of the wipe pattern in A/B wipes can be shifted by operating the POSITIONER lever with the POSITIONER switch set to ON.


POSITIONER
POSITIONER lever
POSITIONER switch
ON
OFF

The positioner effect can be applied only to the following three wipe patterns:



The N/N-R/R switch has no effect when the positioner effect is in use.

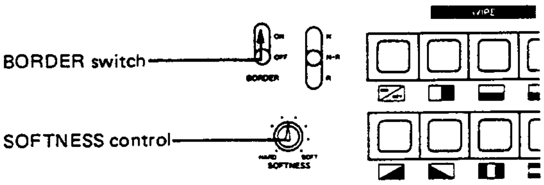


A bus picture B bus picture

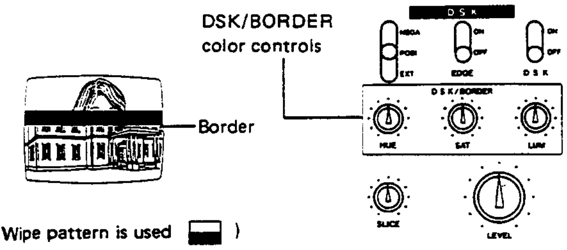
> **Note:**
> - When the POSITIONER section is in operation, wipes are possible to an extent where the wipe pattern is inscribed to the blanking frame. With larger sizes than this, the edges of the pattern will be lost.
> - Do not move the POSITIONER lever rapidly, as this will distort the wipe pattern.

■ Border wipes

To create a border in A/B wipes, set the BORDER switch to ON. The soft border can be adjusted by turning the SOFTNESS control.


WIPE
BORDER switch
ON
OFF
BORDER
N
N-R
R
SOFTNESS control
HARD
SOFT
SOFTNESS

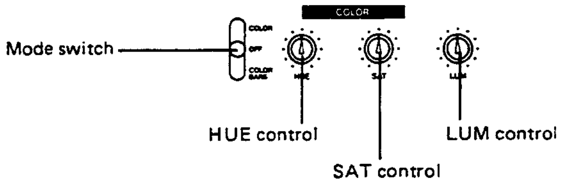
It is also possible to color the border, or make it white or black. This is done by the DSK/BORDER color controls in the DSK section. (For more details refer to page 17.)


DSK/BORDER
color controls
Border
DSK
EXT
EDGE
DSK
ON
OFF
DSK/BORDER
HUE
SAT
LUM
SLICE
LEVEL

(Wipe pattern is used ▄)

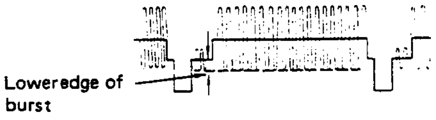
■ Color background function (including color bars)

The color background function generates a color screen purely electronically, without using a color camera, to be used as one of the selectable pictures. Color bars are also available. The COLOR section is used to control the colors.

> **COLOR section**
>
> 
>

COLOR
Mode switch
COLOR
OFF
COLOR BARS
HUE
SAT
LUM
HUE control
SAT control
LUM control
>
> - Mode switch
>   - COLOR : Set the switch to this position when using the color background function.
>   - OFF : Set the switch to this position when using a monochrome background.
>   - COLOR BARS: Set the switch to this position when using the color bars as the background picture.
> - HUE control: For adjustment of hue.
> - SAT control: For adjustment of color saturation.
> - LUM control: For adjustment of luminance.
>
> **Note:**
> - The HUE and SAT controls are effective only when the mode switch is set to COLOR. The LUM control is effective when the mode switch is set to COLOR or OFF. These controls do not function when the color bars picture is being used.

1. Select COLOR on the PRESET bus.
   (The same effect can be obtained by selecting COLOR on other buses.)
2. Set the mode switch as required.
3. If the COLOR or OFF position is selected, create the required color with the HUE, LUM, and SAT controls while observing the preview monitor.

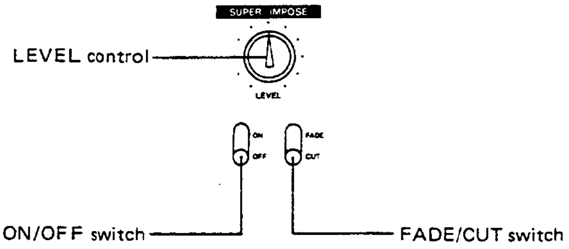
> **Note:**
> Turning down the LUM control too much when the chroma component is high may cause problems with the other components in the system.
> When generating dark colors, be careful to observe the waveforms with a monitor.
> **Be careful that the chroma signal does not drop below the lower edge of the burst signal.**
>
> 
>

Lower edge of burst

▪ SUPERIMPOSE function

White characters and graphics being shot by a black-and-white camera connected to this SUPER terminal of the main unit can be superimposed on the PGM output. The superimpose function is controlled by the SUPERIMPOSE section.

SUPERIMPOSE section



- LEVEL control: Varies the video level of a signal to be superimposed. Turn the control to find a setting which creates the most natural superimpose.
- ON/OFF switch: Switches on or off a superimpose.
- FADE/CUT switch:
  FADE: The superimpose fades in when he ON/OFF switch is set to ON.
  CUT : The superimpose instantly appears in the PGM output when the ON/OFF swtich is set to ON.

1 While the ON/OFF switch in the SUPERIMPOSE section is in the OFF position, press the SUPER button on the PREVIEW bus.
2 Check the signal to be superimposed on the preview monitor.
3 Set the LEVEL control to the fully clockwise position. (The setting of the LEVEL control cannot be checked on the preview monitor.)
4 Set the FADE/CUT switch as required; FADE for gradual insertion of the superimpose, or CUT for instant insertion.
5 Set the ON/OFF switch to ON to send the superimposed signal to the PGM output.

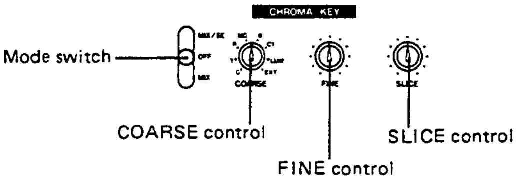
Notes:

- Characters or graphics to be superimposed must be in solid white on the black background.
- A superimpose is mixed at the last stage of PGM output. Therefore, it cannot be controlled by the MIX/SE and MIX levers.
- The operation of the ON/OFF switch affects the PGM output directly. The superimpose effect cannot be checked in advance on the preview monitor. When SUPER is selected on the PREVIEW bus, only the signal to be superimposed coming from the black-and-white camera is output to the preview monitor.

▪ Keying (CHROMA KEY and EXT KEY sections)

The KM-2500 incorporates a chroma key signal generator which allows chroma key effects when an RGB signal is input to the CHROMA KEY INPUT terminal (from the optional KY-15 camera and RM-P200 remote control unit). Also, by applying a video signal to the EXT KEY terminal from a black-and-white camera which is shooting characters or graphics, keying is also possible with that signal.
The chroma key effect can be controlled by the CHROMA KEY section and the FADER lever. Chroma and external keys cannot be used simultaneously.

CHROMA KEY section



Mode switch : Set to MIX/SE when a chroma or external key is to be applied by operating the MIX/SE lever. Set to MIX when the key is to be applied by operating the MIX lever. If MIX/SE is selected without R, G, B input signals, the keying is performed with the Y (luminance) level of the video signal selected on the A bus by the setting of the SLICE knob, and if MIX is selected, it is performed with the Y level of the video signal selected on the PROGRAM bus.

COARSE control: For chroma keying, select one of the positions "G" (Green), "Y" (Yellow), "R" (Red), "MG" (Magenta), "B" (Blue) and "CY" (Cyan) according to the required key color. The "LUM" position has a special function: the Y (luminance) signal, produced from the input R,G,B signals, are used for keying. The effect of the luminance key is the same as that of an external key. For external keying, set the COARSE control to EXT.

FINE control : For fine adjustment of the hue of the selected key color.

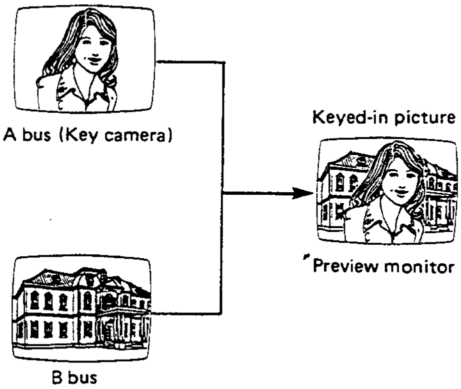
SLICE control: Turn to find the setting where the most natural key effect is obtained.

1. Chroma key

- Press the MIX/KEY button in the WIPE section.
- Apply the video signal from a chroma key camera to one of the 8 inputs.

1) Chroma key with MIX/SE lever (INPUT A and B buses)
  1 Set the mode switch to MIX/SE.
  2 Press SE on the PRESET bus.
  3 Move the MIX/SE lever to the A bus position.
  4 Press the button on the INPUT A bus corresponding to the chroma key camera input.
  5 Move the MIX/SE lever to the B bus position.
  6 Press the button on the INPUT B bus corresponding to the background video into which a key picture is to be inserted.

7 Set the COARSE control to the position corresponding to the color of the area which is cut out from the key picture.
8 Adjust the SLICE and FINE controls while observing the preview monitor so that the resulting key effect becomes most appropriate.



9 Move the MIX/SE lever to the A bus position.
10 Press the SE button on the PROGRAM bus.
11 Move the MIX/SE lever from A to B.
The cut-out area of the key source picture is replaced by the B bus picture with a dissolve effect in the PGM output.

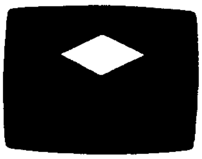
Reference Information

- If a wipe pattern is selected (instead of pressing the MIX/KEY button), keying is also possible in a wipe. In this case, however, the POSITIONER function cannot be used (because the keying signal is cancelled out by the blanking signal which is shifted with the POSITIONER lever.)
- If input selection on the INPUT A and B buses is reversed (the key camera is selected on the B bus), the cut-out area of the key source picture remains and the rest is replaced with the A bus picture.

2) Chroma key with MIX lever (PROGRAM and PRESET buses)
The chroma key available with the MIX lever cannot be checked in advance on the preview monitor, since the key source is selected on the PROGRAM bus. It is recommended that the effect be previewed in the MIX/SE mode (refer to the above 1) 1 – 8.)
1 Move the MIX lever fully up.
2 Press the button on the PROGRAM bus corresponding to the key camera input.
3 Press the button on the PRESET bus corresponding to the background video into which a key picture is to be inserted.
4 Set the mode switch to MIX.
5 Move the MIX lever down. Chroma keying will be performed.

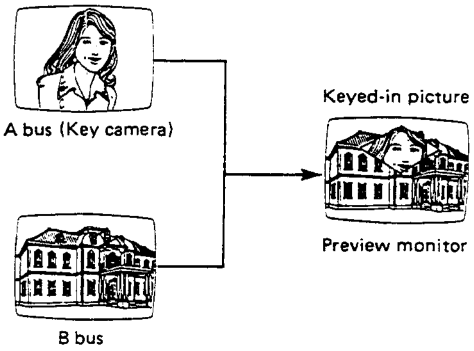
2. EXT KEY operation

- Apply the video signal from a black-and-white camera (key camera) to the EXT KEY input connector of the main unit. The camera subject must be white against a black background.



- Set the COARSE control in the CHROMA KEY section to EXT.

1) External key with MIX/SE lever (INPUT A and B buses)
1 Follow steps 1 – 6 in "1. 1) Chroma key with MIX/SE lever".
2 Adjust the SLICE and FINE controls while observing the preview monitor so that the resulting key effect becomes most appropriate.



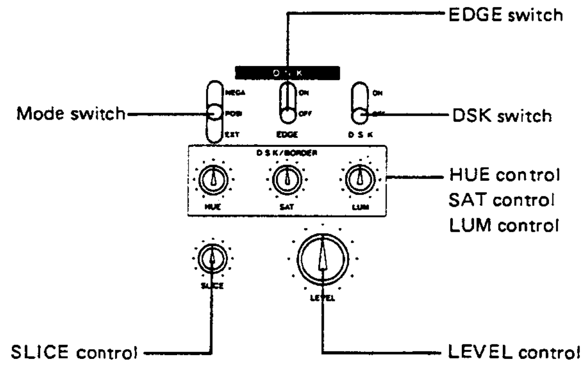
3 Move the MIX/SE lever to the A bus position.
4 Press the SE button on the PROGRAM bus.
5 Move the MIX/SE lever from A to B.
The cut-out area of the key source picture is replaced with the B bus picture with a dissolve effect in the PGM output.

2) External key with MIX lever (PROGRAM and PRESET buses)
As with chroma keys, the external key available with the MIX lever cannot be previewed. It is recommended that the effect be previewed in the MIX/SE mode (refer to the above 1) 1 – 2.)
1 Move the MIX lever fully up.
2 Press the button on the PROGRAM bus corresponding to the key camera input.
3 Press the button on the PRESET bus corresponding to the background video into which a key picture is to be inserted.
4 Set the mode switch to MIX.
5 Move the MIX lever down. External keying will be performed.

▪ Downstream keyer (DSK) function

It is possible to insert characters or graphics from a B/W camera or character generator into the MIX lever output. The key signal can also be colored or filled with video. The downstream keyer can be controlled by the DSK section.

DSK section



Mode switch : Set to NEGA or POSI if the key signal is to be colored. Set to EXT if the key signal is to be filled with video.
The NEGA position should be used when black characters or graphics on a white background are to be keyed in, and the POSI position should be used when white characters or graphics on a black background are to be keyed in.
EDGE switch: Set to ON to produce a border around the outline of the key signal when the key signal is to be colored.
DSK switch : Set to ON to output the DSK effect to the PGM output.
HUE control : For adjustment of hue.
SAT control : For adjustment of color saturation.
LUM signal : For adjustment of luminance.

Note:
These HUE, SAT, and LUM controls can also be used to control the border color in border wipes (refer to page 14, "Border wipes"). When these controls are being used for both DSK and border wipes, complementary colors are available by operating them.

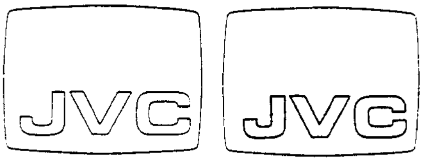
SLICE control: Find the setting where the keying takes place.
LEVEL control: Adjust the video level of the colored key signal or the fill video.

<Note>
- If the color saturation of the characters or graphics keyed in downstream is too high, dot interference occurs along the edges of the key signal due to color subcarrier interference. This is normal with color televisions.

1. DSK operation using only the key signal

– Preparations –
- Connect a color monitor to the DSK PREVIEW terminal. (An alternative is to connect a color monitor to the PREVIEW terminal and select DSK on the PREVIEW bus.)
- Supply a signal from a black-and-white camera or a character generator to the DSK INPUT terminal.

1 Set the mode switch as required.
POSI for white characters or graphics on a black background.
NEGA for black characters or graphics on a white background.
2 Adjust the SLICE and LEVEL controls while observing the preview monitor so that the characters or graphics can be seen most clearly.
3 To color the characters or graphics:
Select a color with the HUE control.
Adjust the color saturation with the SAT control.
Adjust the luminance with the LUM control.
4 If there is no great difference in luminance between the MIX output and the DSK signal, set the EDGE switch to ON to outline the keyed-in part.



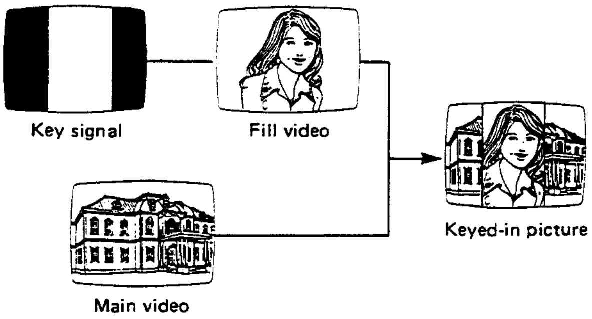
EDGE switch OFF EDGE switch ON

5 Set the DSK switch to ON to send the DSK effect to the PGM output.

2. DSK operation using the fill video

– Preparations –
- Follow the same instructions as in "1. DSK operation using only the key signal".
- Supply the video signal to be used as fill video (picture to be inserted into the key signal) to the EXT DSK INPUT terminal.
This input signal must be genlocked.

1 Set the mode switch to EXT.
2 Adjust the SLICE and LEVEL controls while observing the preview monitor so that the captions or graphics can be seen most clearly.

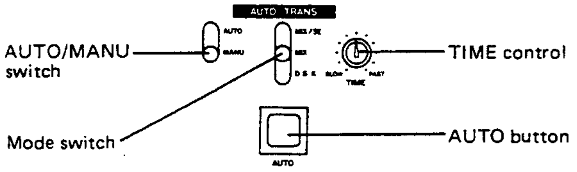


3 Set the DSK switch to ON to send the DSK effect to the PGM output.

▪ Automatic transition (auto switching)

While one video is being output from the PROGRAM bus, the next one is standing by and is preprogrammed so that it can be output automatically by simply pressing a button. In this way, the MIX/SE and MIX lever operation, and DSK ON/OFF operation can be done automatically. This function is controlled by the AUTO TRANS section.

AUTO TRANS section



AUTO/MANU switch: Switches on or off the AUTO TRANS section.

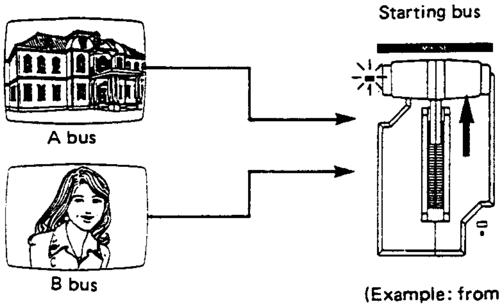
Mode switch : Select the operation assigned to the corresponding lever or switch.
  MIX/SE : To perform the MIX/SE lever operation automatically.
  MIX: To perform the MIX lever operation automatically.
  DSK: To operate the DSK ON/OFF switch automatically.

TIME control: Set the duration from the time when the AUTO button is pressed to the time when the transition is completed. Turning toward FAST makes the duration shorter; toward SLOW, longer.

AUTO button: Press to start a transition. When the button is pressed, the indicator lights. It goes off when the transition is completed. While the indication is on, this auto button is disabled.

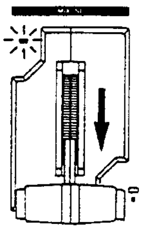
1. Auto transition with MIX/SE lever

1 Set the mode switch to MIX/SE.
2 Select the required input on the INPUT A bus.
3 Select the required input on the INPUT B bus.
4 Set the MIX/SE lever to the A bus position if the picture is to be changed from A to B; to the B bus position if the picture is to be changed from B to A. (This step sets the starting bus.)



(Example: from A to B)

5 Set the AUTO/MANU switch in the AUTO TRANS section to AUTO.
6 Set the MIX/SE lever to the position opposite to the starting bus. Moving the lever does not change the condition of the LEDs. (This step sets the ending bus.)



The lighting LED shows the starting bus.

7 Press the AUTO button. The picture from the bus set in 4 will automatically change to that set in 6 . The LED indicating the starting bus will go off and instead the LED indicating the ending bus will light (as happens when the MIX/SE lever itself is operated).
The transition will be completed in a time preset by the TIME control.
8 Press the AUTO button. The picture from the PROGRAM bus will change automatically to that from the PRESET bus.

Reference Information

- ● If SE is selected on the PROGRAM bus when using the above function, the resulting effect is directly fed to the PGM output. To avoid this, select an input other than SE on the PROGRAM bus, and select SE on the PRESET bus so that the effect can be previewed on the monitor. After preview, set the AUTO/MANU switch to MANU first, and set the starting and ending buses according to 4 and 6 . Now select SE on the PROGRAM bus, and press the AUTO button.
- ● If MIX/KEY is selected in the WIPE section, the transition takes place with the mix effect. If a wipe is selected, the transition takes place with the wipe effect.

2. Auto transition with MIX lever

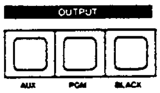
Transitions with the MIX lever are between the PROGRAM and PRESET buses. Therefore, preview is not possible. Check the effect in advance following steps 1 ~ 7 in "1. Auto transition with MIX/SE lever". (Be sure to select MIX/KEY in the WIPE section. Wipes are not possible with the MIX lever.)

1 Set the mode switch in the AUTO TRANS section to MIX.
2 Select the required input on the PROGRAM bus.
3 Select the required input on the PRESET bus.
4 Set the AUTO/MANU switch in the AUTO TRANS section to AUTO.
5 Move the MIX lever fully to the end at which the LED is off.
6 Press the AUTO button. The picture from the PROGRAM bus will change automatically to that from the PRESET bus.

3. DSK auto transition

- Before this operation, complete preparations for a DSK effect following the information in "Downstream keyer" on page 17.
  1. Make certain that the DSK switch in the DSK section is OFF.
  2. Set the mode switch in the AUTO TRANS section to DSK.
  3. Set the AUTO/MANU switch in the AUTO TRANS section to AUTO.
  4. Set the DSK switch in the DSK section to ON.
  5. Press the AUTO button in the AUTO TRANS section. The DSK key will be inserted automatically into the PGM output. The transition will be completed in the time preset with the TIME control.
  6. Press the AUTO button in the AUTO TRANS section again to obtain the picture before keying. (The keyed and non-keyed pictures will alternate each time the AUTO button is pressed.)

■ Output selection



The OUTPUT section determines the final output from the KM-2500.

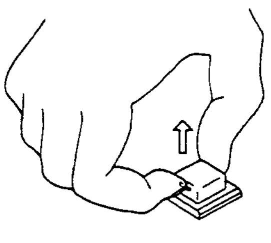
PGM : (On-air signal) The video signal with added effects is output from the KM-2500.

BLACK: (Black signal) A black signal is output. When this button is pressed, the PGM output fades to black slowly. Pressing the PGM button fades the PGM signal in again. This function can be effectively used for opening or closing a program.

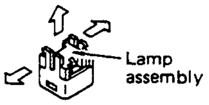
AUX : This is used to output the input signal (non-locked signal) from a VTR, etc.

■ Lamp assembly replacement

If a lamp bulb in the buttons on buses or wipe select buttons fails, replace it with a spare.



Remove the top cover.



Key top

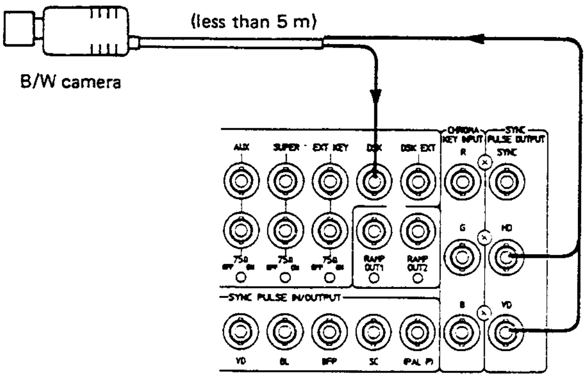
Remove the lamp from the top cover, insert a new one, and then replace the top cover.

■ Caption camera drive signal (SYNC PULSE OUTPUT)

The caption camera (black-and-white camera) for external or downstream keys must have an external sync capability and be locked to the sync system of the KM-2500. The sync signal can be supplied to the camera from the SYNC PULSE OUTPUT terminals. Three different sync signals are available: HD, VD and SYNC. Choose appropriate ones depending on the camera used.

The cable connecting the KM-2500 and the DSK camera must not exceed 5 m (a total of 10 m of cable is the maximum, a 5 m sync cable and a 5 m return video cable).

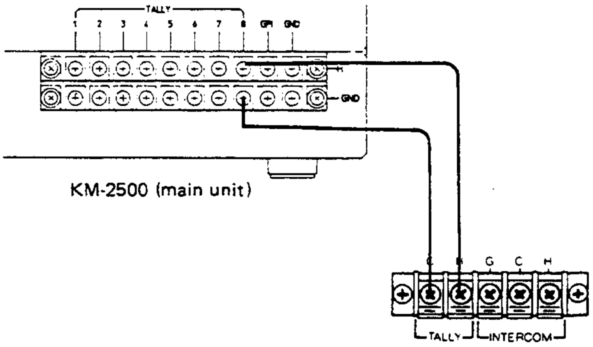
With longer cables, the horizontal phase will differ between the DSK output and the PGM output with DSK effect when previewed on the monitor.



■ Tally signal output

In video systems using several cameras, it is necessary to let camera operators and performers know which camera(s) are being used as inputs to the KM-2500. For this purpose, the KM-2500 outputs tally signals to other equipment.

- Connect the TALLY terminals of the main unit to the TALLY terminals of connected equipment (for example, the RM-P200) as illustrated. The tally output is in the form of voltage.



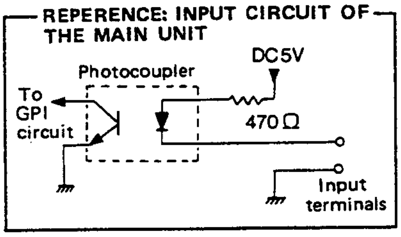
Example: RM-P200 Remote Control Unit (optional)

Use the output tally signals for tally systems requiring less than the following rating:

Voltage supply: 5V DC, 10 mA max.

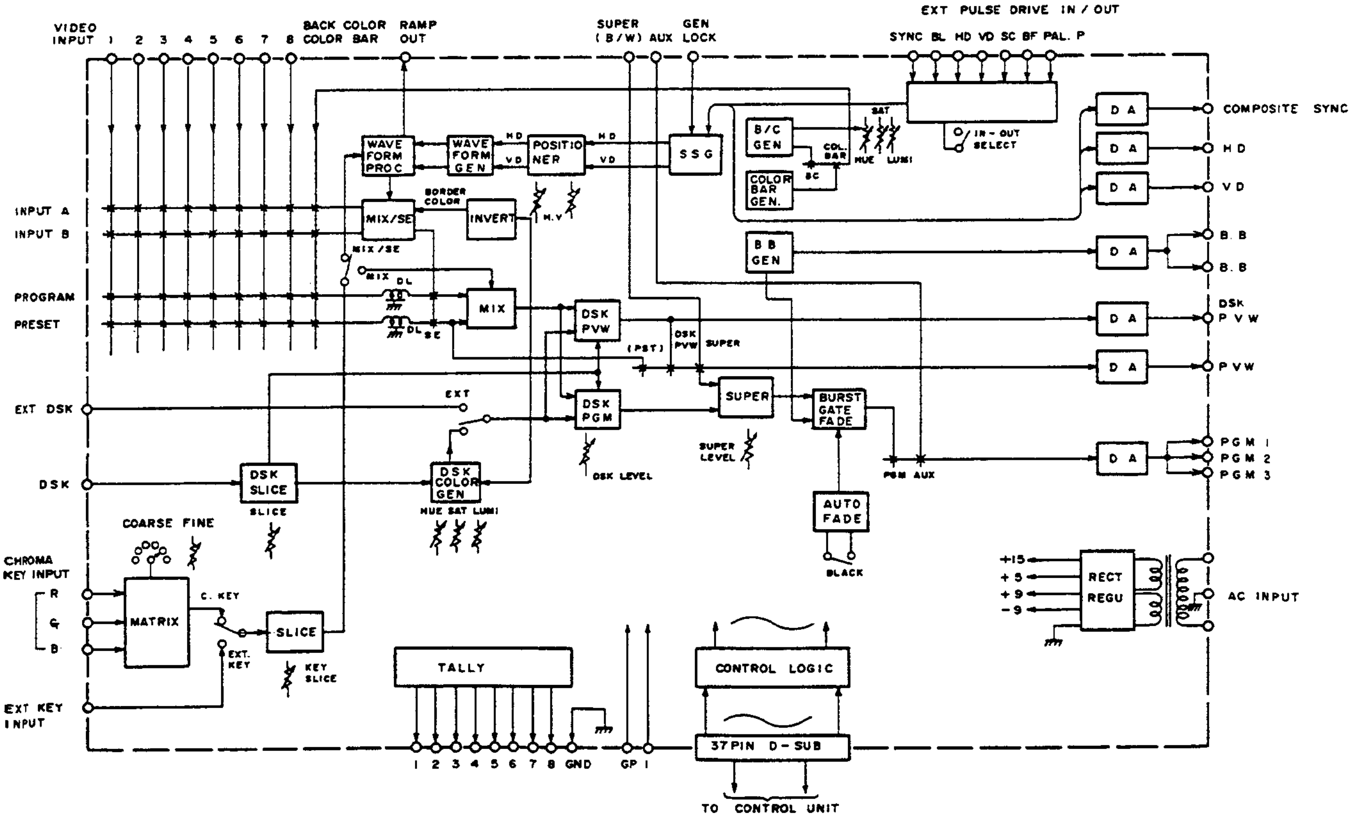
■ Connecting to GPI (General Purpose Interface)

When the interface is connected to this terminal, the AUTO TRANS function will be activated.


REPERENCE: INPUT CIRCUIT OF THE MAIN UNIT
DC5V
Photocoupler
To GPI circuit
470Ω
Input terminals

With this connection, the same effect is obtained as when the AUTO button is pressed. (See page 19.)

BLOCK DIAGRAM (MAIN UNIT)


VIDEO INPUT
1
2
3
4
5
6
7
8
BACK COLOR
COLOR BAR
RAMP OUT
SUPER (B/W)
AUX
GEN LOCK
EXT PULSE DRIVE IN / OUT
SYNC
BL
HD
VD
SC
BF
PAL. P
WAVE FORM PROC
WAVE FORM GEN
HD
VD
POSITIONER
HD
VD
SSG
B/C GEN
COL. BAR
SC
COLOR BAR GEN.
SAT
HUE
LUMI
IN - OUT SELECT
D A
COMPOSITE SYNC
D A
H D
D A
V D
INPUT A
INPUT B
BORDER COLOR
MIX/SE
INVERT
H.V
MIX/SE
MIX
DL
B B GEN
D A
B. B
B. B
PROGRAM
PRESET
DL
SE
MIX
DSK PVW
(PST)
DSK PVW
SUPER
D A
DSK P V W
D A
P V W
EXT DSK
EXT
DSK PGM
DSK LEVEL
SUPER
SUPER LEVEL
BURST GATE FADE
PGM
AUX
D A
P G M 1
P G M 2
P G M 3
DSK
DSK SLICE
SLICE
DSK COLOR GEN
HUE SAT LUMI
AUTO FADE
BLACK
COARSE FINE
CHROMA KEY INPUT
R
G
B
MATRIX
C. KEY
SLICE
EXT. KEY
KEY SLICE
+15
+5
+9
-9
RECT REGU
AC INPUT
EXT KEY INPUT
TALLY
1 2 3 4 5 6 7 8 GND
GP I
CONTROL LOGIC
37PIN D-SUB
TO CONTROL UNIT

SPECIFICATIONS

Video inputs : Eight composite video signals
1 Vp-p 75 ohms or high (BNC)

AUX input : One composite video signal
(non-synchronous 1 Vp-p
75 ohms or high (BNC)

Chroma key inputs : R,G,B non-composite video signals
0.7 Vp-p 75 ohms or high (BNC)

External key input : One composite or non-composite
video signal 1/0.7 Vp-p
75 ohms or high (BNC)

D.S.K key input (Downstream key) : One composite video signal
1 Vp-p 75 ohms or high (BNC)

DSK video input : One composite video signal
1 Vp-p 75 ohm or high (BNC)

B/W superimpose input : One composite video signal
1 Vp-p 75 ohms or high (BNC)

Program output : Three composite video signals
1 Vp-p 75 ohms (BNC)

Preview output : One composite video signal
1 Vp-p 75 ohms (BNC)

Frequency response : 60 Hz to 5 MHz ±0.3 dB

DG : Less than 1.5 % at 10 to 90 % APL

DP : Less than 1.5 % at 10 to 90 % APL

S/N : More than 60 dB (p-p/rms)

Sync output : HD, VD, composite SYNC for
external synchronization of
B/W camera. 4 Vp-p 75 ohms. (BNC)

SYNC PULSE output

- NTSC model
: SYNC, BL, HD, VD, BFP 4 Vp-p and
SC 2 vp-p for external
synchronization, 75 ohms (BNC)
(*These pulse are not available
in EXT PULSE DRIVE mode)
- PAL model
: SYNC, BL, HD, VD, BFP PAL.P
4 Vp-p and SC 1 Vp-p for external
synchronization, 75 ohms (BNC)
(*These pulse are not available
in EXT PULSE DRIVE mode)

B.B (BLACK BURST) output : Black burst signals 0.43 Vp-p
(NTSC), 0.45 Vp-p(PAL)
75 ohms. (Two outputs)
For camera genlocking (BNC)

Synchronization system : 1. Internal mode
2. External mode – Genlocked by composite video or black burst signal
3. Pulse drive mode – External SYNC, BL, HD, VD, BFP, SC, PAL-P

Note: Required internal switching.
Refer to page 8.
PAL-P is available for
PAL model.

Subcarrier phase : Adjustable from 0° to 360°
Coarse : In steps (0°, 120°, 240°)
Fine : Continuously variable between steps

Horizontal phase accuracy : ±0.1 microseconds (with reference to the input synchronization signal)

Wipe patterns

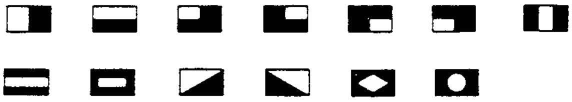


Fig. 1-1

Positioner : Effective to ▭ ◇ □

Tally : 5 V DC (10 mA max.)

Ambient temperature range : 0°C to 40°C (32°F to 112°F)

Power consumption

- U version
: AC 120 V 60 Hz 70 W (with Control unit)
- E version
: AC 220/240V, 50/60 Hz, 70 W
(with Control unit)

Dimensions & weight
1. Main unit
Standard EIA rack size (4 unit size)
12.5 kg
2. Control unit
Standard EIA rack size (6 unit size)
5.0 kg

* The two units are connected with 10 m cables of 37 pin connector.

Accessories

Power cord : QMP9003-002 (U version)
QMP4908-250 (EG version)
SCV0419-2M5 (EK version)
SCV0420-2M5 (EA version)

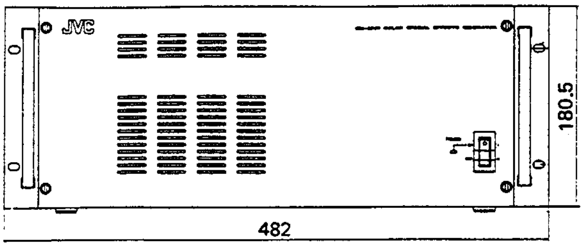
Cable Assembly : SCV1531-10M, 10 m (32 feet)

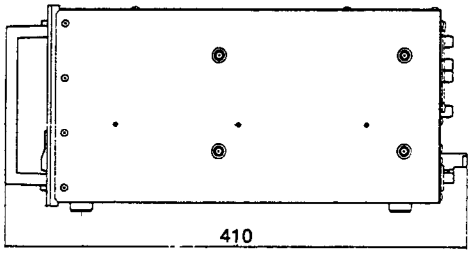
Coaxial cable(BNC-BNC): SCV0406-001

Assembly lamp : SCV0302-100

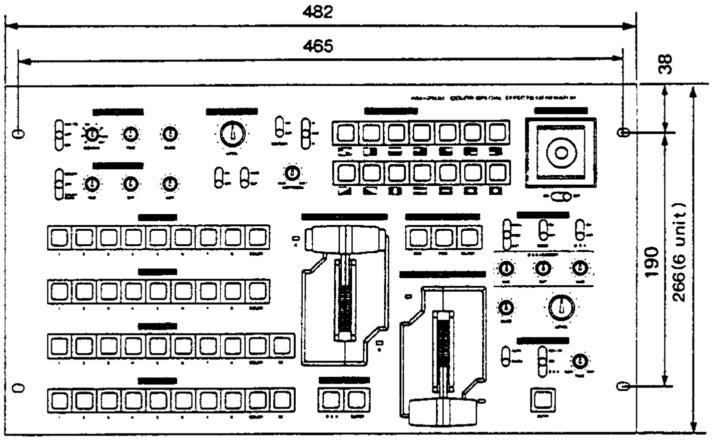
DIMENSIONS (unit mm)

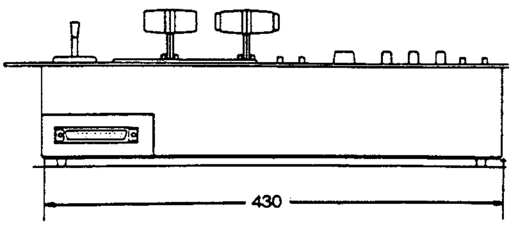
MAIN UNIT

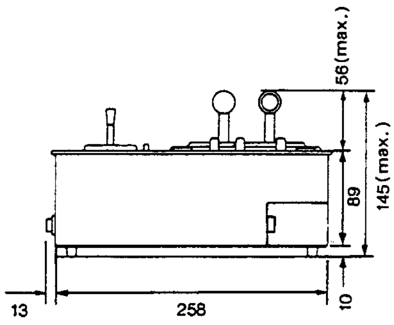

JVC
180.5
482



CONTROL UNIT


482
465
38
190
266(6 unit)




56(max.)
89
145(max.)
13
258
10

JVC
VICTOR COMPANY OF JAPAN, LIMITED

Printed in Japan

CIRCUIT DESCRIPTION

1. DIFFERENCE BETWEEN KM-2500 AND KM-2000

The KM-2500 is an upgrade mode of the KM-2000. Although there is little difference between the two just for their control panel layouts, as a matter of fact, KM-2500 differs from KM-2000 in such details as operativeness, configuration of internal P.C. boards and circuit designs. Table 1-1 shows the difference between the two models.

Table 1-1 Difference between KM-2500 and KM-2000

	Item	KM-2500	KM-2000
Function	Built-in color bars signal	Full color bars	None
	Color border wipe	Possible	Impossible
	Auto transition	Possible (with Time controller)	Impossible
	Flip-flop operation by MIX lever	Possible	Impossible
	Chroma key operation	By either lever of MIX and MIX/SE	By MIX/SE lever only
	SSG pulse outputs	SYNC, BL, HD, VD, BFP, and SC PAL P (only in the model for PAL system) available	SYNC, HD, VD available
	GPI input	Provided (for starting AUTO transition)	Impossible
	DSK fill video input control	Possible (switchable between this and DSK color input)	Impossible (DSK color only)
	AUX preview	Impossible	Possible
	Intercom.	Not provided	Two-wire system
	SSG	Equivalent to KY-950B's SSG	Equivalent to KY-2000's SSG
	Control signal and its transmission system between the main body & control unit	Time division serial transmission of digital signal (Extendable up to 10 m)	Parallel transmission of analog signal (DC) (Extendable up to 5 m)
Mechanism	Size of main P.C. board	245 x 305 mm (expanded) (No interchangeability with that of KM-2000)	155 x 305 mm
	P.C. board(s) structure on the control panel	Composed of one circuit board	Composed of split circuit boards

2. SIGNAL GENERATOR CIRCUIT FOR BUTTON/SWITCH INPUT DATA

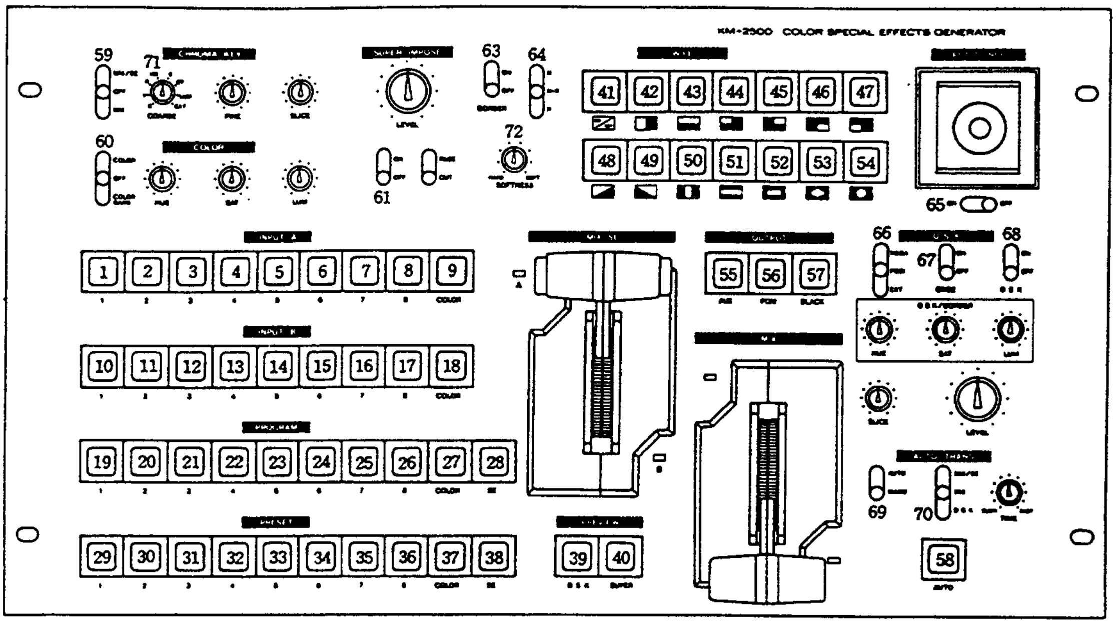


Fig. 2-1 Buttons and switches on the control panel

For serial transmission of digital signal between the control unit and the main unit, it is necessary to digitalize operation data of the switches and buttons on the control panel, for instance, ON/OFF information and set positions of them, and digitalized signals are transmitted to the data transmitter.

The following explains about this processing.

2.1 CLASSIFICATION OF DATA PROCESSING SYSTEMS

Fig. 2-1 illustrates buttons and switches on the control panel.

There are 58 illuminated buttons (No. 1 to No. 58) and 12 toggle switches (No. 59 to No. 70) , and 2 rotary code switches (No. 71 and No. 72). Their data processing systems are classified as follows.

1) Direct transmission of switch ON/OFF information to the transmitter:

   This applies to all of 12 toggle switches (No. 59 to No. 70). 0 V DC or 5 V DC is supplied to the transmitter according to the setting position of a switch.

2) To send data which are binary-coded by respective switches to the transmitter:

   This applies to 2 rotary code switches (No. 71, No. 72). Binary-coded data corresponding to the setting position of a switch is supplied to the transmitter.

   Table 2-1 and Table 2-2 show relations between binary codes and switches' positions.

3) To send data converted into binary codes by group to the transmitter:

   This applies to illuminated buttons (No. 1 to No. 38 and No. 41 to No. 57).

   Binary-coded data corresponding to pressed buttons are supplied to the transmitter by 6 groups.

   Detail of this processing will be described in Section 2.2.

4) Others:

- ON/OFF information of an illuminated button (No. 58 - AUTO) is used for triggering the auto transition circuit. Therefore, this information is neither coded as data nor supplied to the transmitter.
- With regard to illuminated buttons No. 39 (PREVIEW DSK) and No. 40 (PREVIEW SUPER), trigger pulses generated by ON/OFF operation of the buttons are once supplied to the D. flip-flop and its output is supplied to the transmitter as data.

  To prohibit the two buttons to come on simultaneously, generated trigger pulses are supplied to the D. flip-flop's reset terminal.

  IC18-A/B on the SB board is the D. flip-flop circuit.

Table 2-1

Set positions of CHROMA KEY COARSE control (No. 71)	Data CK SEL.		
	A	B	C
G	0	0	0
Y	1	0	0
R	0	1	0
MG	1	1	0
B	0	0	1
CY	1	0	1
LUM	0	1	1
EXT	1	1	1

Table 2-2

Set positions of SOFTNESS control (No. 72)	Data		
	A	B	C
Counterclockwisemost	1	1	1
(SOFTNESS OFF)	0	1	1
	1	0	1
↓	0	0	1
	1	1	0
	0	1	0
Clockwisemost	1	0	0
(SOFTNESS MAX.)	0	0	0

2.2 BINARY CODE CONVERTER CIRCUIT (SB board)

The following is an explanation about the binary code converter circuit whose outline is mentioned in Section 2.1 - 3). There are 55 buttons whose ON/OFF informations are transmitted in binary-coded data, and they are classified into the following 6 groups.

Group 1 : Selector buttons on A BUS line (9 pcs.)
Group 2 : Selector buttons on B BUS line (9 pcs.)
Group 3 : Selector buttons on PROGRAM BUS line (10 pcs.)
Group 4 : Selector buttons on PRESET BUS line (10 pcs)
Group 5 : Wipe pattern selector buttons (14 pcs.)
Group 6 : PGM output selector buttons (3 pcs.)

2.2.1 Selector buttons on A BUS line

Fig. 2-2 illustrates the data conversion block diagram of the selector buttons on the A BUS (B BUS) line.
The circuit is composed of the binary code converter circuit of the priority encoder and the latch circuit.
The circuit structure of the B BUS line is the same as that of the A BUS line.

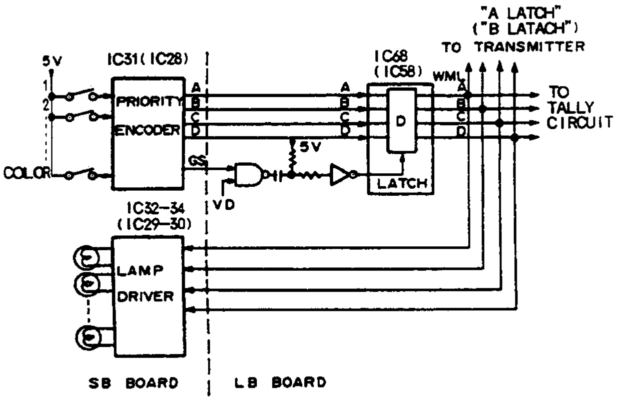

"A LATCH"
("B LATACH")
TO TRANSMITTER
5V
IC31 (IC28)
1
2
COLOR
PRIORITY ENCODER
A
B
C
D
GS
IC68
(IC58)
WML
D
LATCH
5V
VD
TO TALLY CIRCUIT
IC32–34
(IC29–30)
LAMP DRIVER
SB BOARD
LB BOARD

Fig. 2-2 Binary code converter for A BUS line

1) Priority encoder (SB board)
When input is selected for the A BUS line on the control panel, informations about the switches are converted into 4-bit binary codes as shown in Fig. 2-3 and Table 2-3.

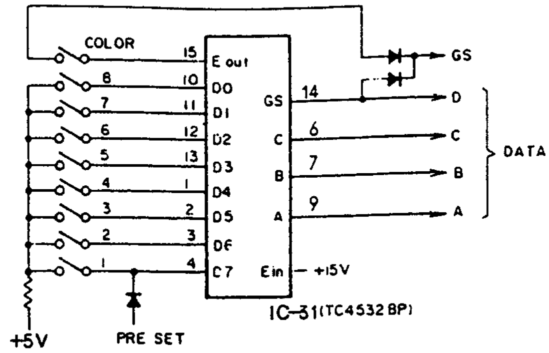

COLOR
15
E out
8
10
D0
7
11
D1
6
12
D2
5
13
D3
4
1
D4
3
2
D5
2
3
DF
1
4
C7
GS
14
C
6
B
7
A
9
Ein
+15V
GS
D
C
B
A
DATA
+5V
PRE SET
IC-31 (TC4532 BP)

Fig. 2-3

IC31 is an 8-input priority encoder which functions to encode the most significant signal among 8 input signals into 3-bit parallel signal and puts out higher input signal according to priority.
Accordingly, this prevents erroneous signal to be processed even in case of double keying. In this model, there are nine kinds of input signals, therefore, GS terminal's output is utilized as 4-bit output since it becomes "L" when D_0 to D_7 inputs are all "L". At that time, potential of Eout is "H", which is used as GS signal when the COLOR button is pressed.
Encoded A, B, C, D signals (binary codes) and GS (Group Select) signal are sent to the latch circuit on the LB board. GS signal becomes "H" when any selector button is pressed. Table 2-4 shows relation between pressed buttons and binary codes/GS signal.

Table 2-4 Group 1 and Group 2 buttons

	A BUS INPUT SELECT signal B BUS INPUT SELECT signal				
Button	GS	D	C	B	A
1	H	H	H	H	H
2	H	H	H	H	L
3	H	H	H	L	H
4	H	H	H	L	L
5	H	H	L	H	H
6	H	H	L	H	L
7	H	H	L	L	H
8	H	H	L	L	L
COLOR	H	L	L	L	L

Table 2-3 TC4532 truth table

INPUT								OUTPUT				
D7	D6	D5	D4	D3	D2	D1	D0	GS	C	B	A	E OUT
X	X	X	X	X	X	X	X	L	L	L	L	L
L	L	L	L	L	L	L	L	L	L	L	L	H
H	X	X	X	X	X	X	X	H	H	H	H	L
L	H	X	X	X	X	X	X	H	H	H	L	L
L	L	H	X	X	X	X	X	H	H	L	H	L
L	L	L	H	X	X	X	X	H	H	L	L	L
L	L	L	L	H	X	X	X	H	L	H	H	L
L	L	L	L	L	H	X	X	H	L	H	L	L
L	L	L	L	L	L	H	X	H	L	L	H	L
L	L	L	L	L	L	L	H	H	L	L	L	L

2) Latch circuit (LB board)

Since binary-coded signals supplied to the LB board are generated only for the period when selector switch(es) is pressed, they are latched by the following manner.

IC68 (TC4042BP) has four D. flip-flop latch circuits. They receive binary code by timing of the latch pulse which is made from GS signal and VD sync signal generated by the SG board, and put out those signals through Q1 to Q4.

On the A BUS line, if a button is pressed as another button is held depressed, the upper button is selected on the priority encoder, however, the latch circuit does not function since potential of GS signal is "H" as far as the buttons are pressed. Consequently, the NAND circuit starts operation with inputs of VD sync signal and GS signal, and, latch pulse well-timed with the VD signal is put out when GS signal is "H".

The output signal is branched into three to be sent to the next circuits respectively.

- Llighting circuit

  In this line, the output signal is sent back to the SB board in which IC33 decodes the signal and the lamp driver (IC32, IC34) turns on the lamp corresponding to the signal.

- In the second line, the signal is supplied to the tally circuit (IC70).
- In the third route, the signal is supplied to the data selector circuit of the transmitter as "A LATCH A/B/C/D" signal.

2.2.2 PROGRAM BUS and PRESET BUS selector buttons

Fig. 2-4 shows the selector button data conversion block diagram of the PROGRAM BUS and PRESET BUS lines. As same as the A/B BUS LINE selector buttons, the circuit is composed of the priority encoder and latch circuit.

The latch circuit consists of 3 steps, which are provided for flip-flop operation.

1) Priority encoder (SB board)

IC24 and IC25 function as the priority encoder for the PROGRAM BUS while IC19 and IC20 for the PRESET BUS lines.

Their operations are the same as that for the A BUS line except that two priority encoders are used in cascade connection respectively since each line has 10 selector buttons.

Table 2-5 shows relation between pressed buttons and binary-coded data.

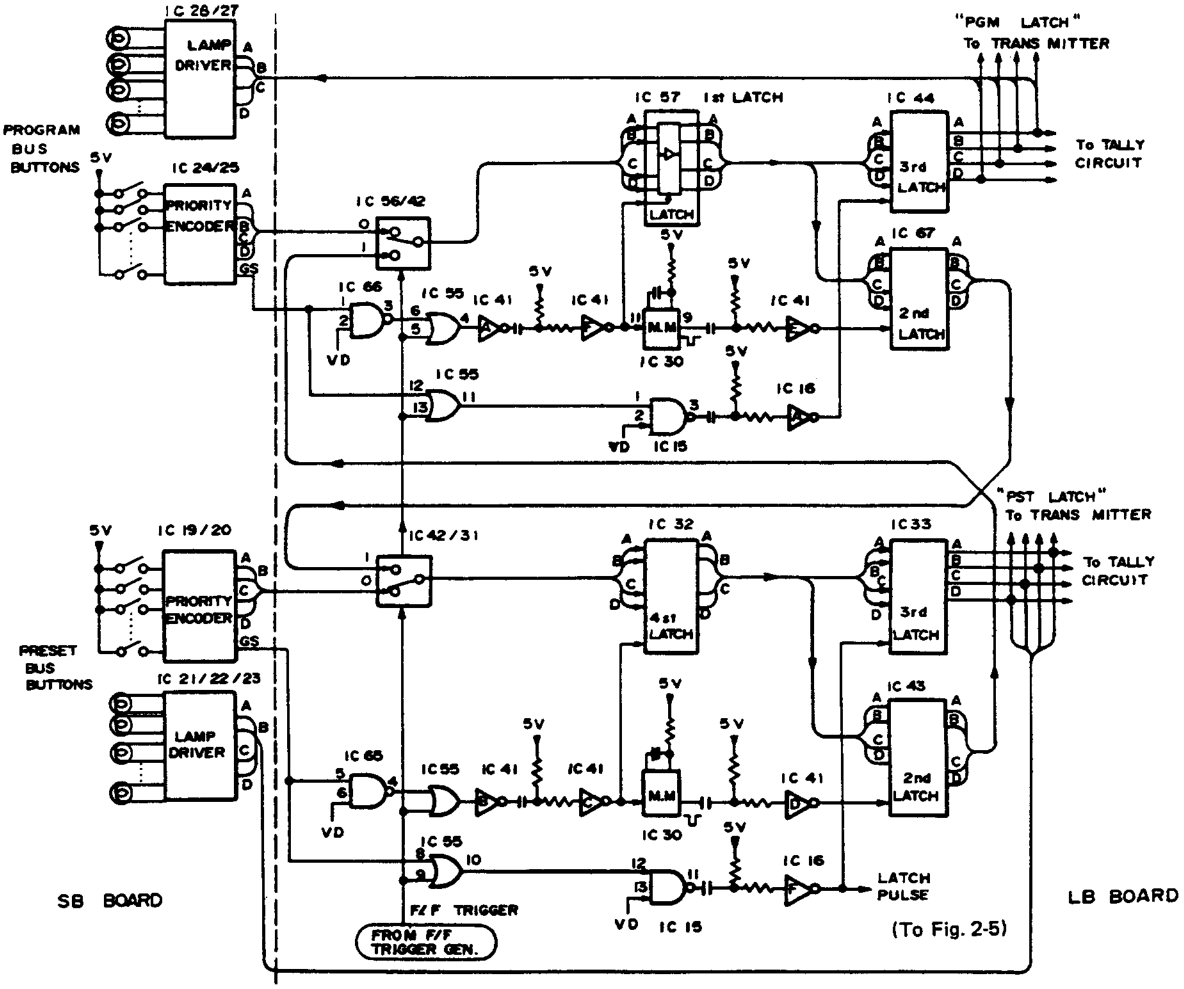

IC 28/27
LAMP DRIVER
PROGRAM BUS BUTTONS
5V
IC 24/25
PRIORITY ENCODER
GS
IC 56/42
IC 66
VD
IC 55
IC 41
IC 57 1st LATCH
LATCH
IC 30
M.M
IC 16
IC 15
IC 44
3rd LATCH
IC 67
2nd LATCH
"PGM LATCH" To TRANS MITTER
To TALLY CIRCUIT
"PST LATCH" To TRANS MITTER
To TALLY CIRCUIT
5V
IC 19/20
PRIORITY ENCODER
PRESET BUS BUTTONS
IC 21/22/23
LAMP DRIVER
IC 42/31
IC 65
IC 55
IC 41
IC 32
4st LATCH
IC 33
3rd LATCH
IC 43
2nd LATCH
IC 30
IC 16
IC 15
LATCH PULSE
(To Fig. 2-5)
F/F TRIGGER
FROM F/F TRIGGER GEN.
SB BOARD
LB BOARD

Fig. 2-4 PGM BUS/PST BUS latch data generator

Table 2-5 Group 3 and Group 4 buttons

	PROGRAM BUS INPUT SELECT signal PRESET BUS INPUT SELECT signal				
Button	GS	D	C	B	A
1	H	H	H	H	H
2	H	H	H	H	L
3	H	H	H	L	H
4	H	H	H	L	L
5	H	H	L	H	H
6	H	H	L	H	L
7	H	H	L	L	H
8	H	H	L	L	L
COLOR	H	L	H	H	H
SE	H	L	L	H	H

2) Latch circuit and its flip-flop operation (LB board)

The following explains about the PROGRAM BUS line by way of example.

The priority encoder's output data A/B/C/D are supplied to the 1st step of the latch circuit (IC57) through the analog switch (IC56, IC42). The latch circuit latches data A/B/C/D timing with the latch pulse produced from GS and VD sync signals in the same manner as the A BUS line, and then puts out the signal to the 2nd and 3rd steps.

The 2nd latch circuit (IC67) latches the data supplied from the latch circuit of the 1st step with the latch pulse which is delayed by a monostable multivibrator (IC30). The 2nd step's output is used as input signal of the analog switch (IC42, IC31) of the PRESET BUS line.

The 3rd latch circuit (IC44) latches the data in time with the VD sync signal, and the output is supplied to the lamp driver circuit, tally circuit and transmitter in the same manner as in the A BUS line.

Before the data signals are sent to the 1st latch circuit, they pass an analog switch (IC56/42) which is turned on or off by flip-flop trigger pulse generated at finish of the MIX lever's switching operation.

Receiving the flip-flop trigger input, the analog switch starts switchover of the input system so as to introduce the PRESET BUS line data which have been supplied through other input terminals. At the same time, latch pulse is produced as a result of generation of flip-flop trigger pulse, then, the 1st, 2nd and 3rd latch circuits start to latch data of the PRESET BUS line.

The above explanation applies to the latch circuits of the PROGRAM BUS line, however, to the contrary, data of the PROGRAM BUS line are latched with flip-flop trigger pulse in the PRESET BUS line.

As above-mentioned, data of the PROGRAM BUS line and the PRESET BUS line are switched with the flip-flop trigger pulse. This operation is called flip-flop between buses.

3) Flip-flop trigger pulse generator (SB/LB board)

See Fig. 2-5.

Flip-flop trigger pulse is generated when dissolve (cross-fade) operation by the MIX lever on the control panel finishes.

According to the set position of the MIX lever, +5 V to 0 V DC is produced to be supplied to IC5-A/B of the LB board. IC5-A/B is a window comparator, which produces fader limit signals FLH and FLL according to the MIX lever voltage.

Table 2-6 shows relation between set position of the MIX lever and potential of FLH, FLL signals.

Table 2-6 FLH/FLL

Position of MIX lever	FLH	FLL
Topmost	L	H
↕	H	H
Bottommost	H	L

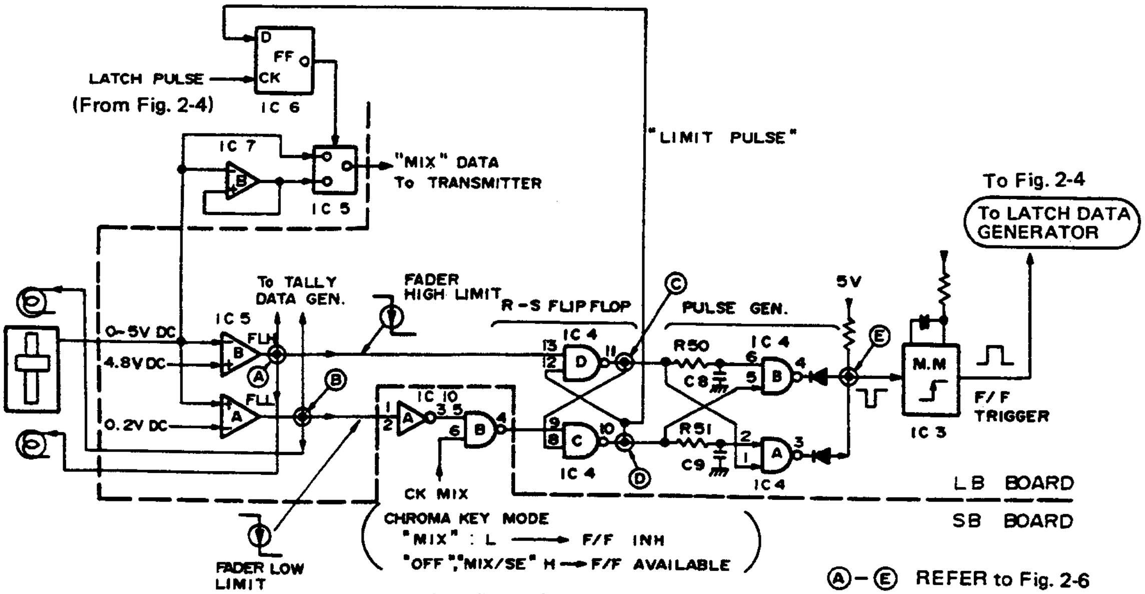

LATCH PULSE
(From Fig. 2-4)
D
FF
Q
CK
IC 6
IC 7
B
IC 5
"MIX" DATA
To TRANSMITTER
"LIMIT PULSE"
To Fig. 2-4
To LATCH DATA GENERATOR
To TALLY DATA GEN.
FADER HIGH LIMIT
R-S FLIPFLOP
PULSE GEN.
5V
0-5V DC
4.8V DC
0.2V DC
IC 5
FLH
FLL
A
B
Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓔ
IC 10
IC 4
R50
C8
R51
C9
M.M
IC 3
F/F TRIGGER
CK MIX
CHROMA KEY MODE
"MIX" : L ⟶ F/F INH
"OFF","MIX/SE" H ⟶ F/F AVAILABLE
LB BOARD
SB BOARD
FADER LOW LIMIT
Ⓐ-Ⓔ REFER to Fig. 2-6

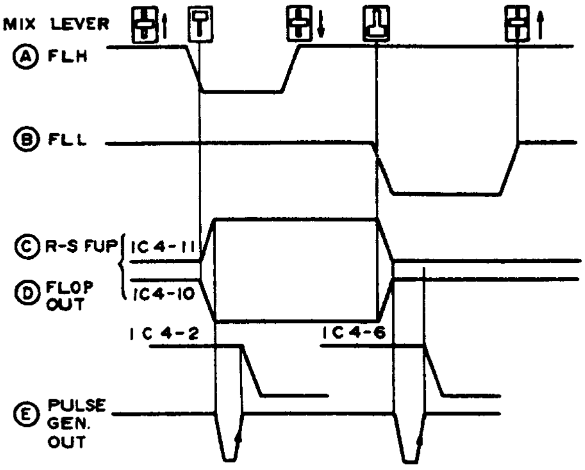
Fig. 2-5 Flip-flop trigger generator

These FLH and FLL signals generated by IC5-A/B are supplied to the R-S flip-flop circuit composed of IC4-C/B, however, this FLL signal passes IC10-A/B (NAND gate) on the SB board before it enters IC4-C/B. The NAND gate functions to prohibit the MIX lever from flip-flop operation during chroma key effect produced by the MIX lever.

When the CHROMA KEY MODE switch is set to "MIX" position, the potential of the FLL signal is held at "H" by the NAND circuit and, at the same time, flip-flop operation of IC4-C/D is prohibited.

When the CHROMA KEY MODE switch is set to "OFF" or "MIX/SE" position, the FLL signal is supplied to the RS flip-flop circuit.

The RS flip-flop circuit changes its output mode as either potential of FLH or FLL signal becomes "L", and the output is supplied to IC4-A/B and the pulse generator composed of R50, R51, C8 and C9.



For Ⓐ – Ⓔ : Refer to Fig. 2-5.

Fig. 2-6 Latch pulse timing

As shown in Fig. 2-6, the pulse Ⓔ is accordingly produced when the MIX lever is set to the uppermost or lowermost position. The pulse Ⓔ is supplied to IC3 (monostable multivibrator) to be used as flip-flop trigger pulse.

With this flip-flop trigger pulse produced by every setting of the MIX lever to the uppermost or lowermost position, the above-mentioned latch circuit performs switchover of data inputs from the PROGRAM BUS line and the PRESET BUS line.

2.2.3 WIPE PATTERN selector buttons

Fig. 2-7 is a block diagram of this circuit.

As same as the circuits of other selector buttons, this circuit is composed of a priority encoder and a latch circuit.

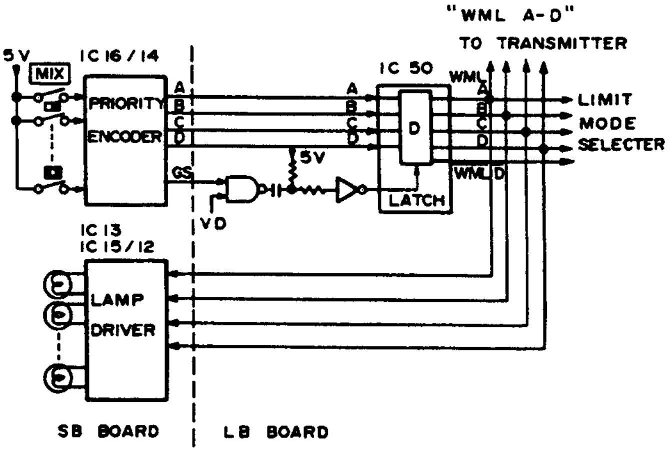


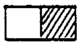
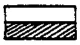
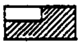
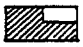
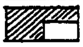
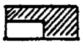
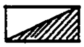
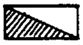
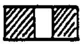
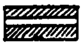
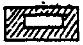
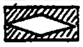
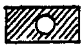
Fig. 2-7 Binary code converter for WIPE buttons

1) Priority encoder (SB board)

   Similarly to the priority encoder for the PROGRAM BUS line and PRESET BUS line selecor buttons, two priority encoders (IC16, IC14) combined in cascade connection are used for this circuit.

   Table 2-7 shows relation between selected wipe patterns and binary codes/GS (group select) signals.

Table 2-7 Buttons of Group 5

	WIPE MODE SELECT				
Button	GS	D	C	B	A
WIPE/MIX	H	H	H	H	H
	H	H	H	H	L
	H	H	H	L	H
	H	H	H	L	L
	H	H	L	H	H
	H	H	L	H	L
	H	H	L	L	H
	H	L	H	H	H
	H	L	H	H	L
	H	L	H	L	H
	H	L	H	L	L
	H	L	L	H	H
	H	L	L	H	L
	H	L	L	L	H

Encoded signals (A, B, C, D, GS) are supplied to the latch circuit of the LB board.

2) Latch circuit (LB board)

Button SELECT signals supplied from the SB board are latched by this circuit whose operation is the same in principle as that of the latch circuits for the A BUS and B BUS LINE SELECT signals. In detail, IC50 latches signals and sends the latched data to the next circuits of the following.

- Lamp driver circuit (IC13, IC15/12, SB board)
- Data selector circuit to which the signals are sent as 'WML A, B, C, D" data.
- Limit mode selector circuit (see Sect. 2.3.2), to which $\overline{\text{WML D}}$ (inverted output of WML D) is supplied at the same time.

2.2.4 PGM output selector buttons

This circuit is composed of a priority encoder circuit (SB board) and a latch circuit (LB board) as same as the circuit of the A BUS LINE selector buttons.

Table 2-8 shows relation between selected buttons and binary codes encoded by selection.

Table 2-8 Buttons of Group 6

	PGM OUTPUT SELECT		
	GS	PGO B	PGO A
AUX	1	0	1
PGM	1	1	0
BLACK	1	1	1

Signals of PGO A and PGO B are latched by IC47 of the LB board in time with the latch pulse produced by GS and VD sync signals, and the latched PGO A and PGO B signals are supplied to the next circuits of the following.

- Lamp driver circuit (IC8/9, SB board)
- FTB (Fade-To-Black) control circuit (see Sect. 2.4.3) and
- Transmitter's data selector circuit, to which only the SELECT signal "B" is supplied as "PGO B" signal.

2.3 MIX/SE LEVER LIMIT POSITION DETECTOR CIRCUIT (LB board)

This circuit detects the limit positions of the MIX/SE lever. This circuit is composed of a window comparator, limit mode selector circuit and a polarity signal generator circuit.

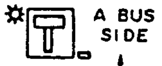
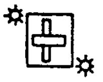
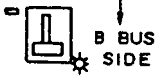
2.3.1 Window comparator

This detects the limit positions of the MIX/SE lever and produces limit signals by utilizing input of lever voltages which are supplied to the window comparator from the SB board.

Two window comparators are provided for individual operation of the H lever and V lever since the MIX/SE lever has these two levers separately. IC7-A/B is for the H lever while IC6-A/B for the V lever.

Relation between limit signals and lever positions is shown in Table 2-9.

Table 2-9 Limit signals (common to H & V levers)

Position of Lever	A LIMIT	B LIMIT
	H	L
	H	H
	L	H

Limit signals obtained at this stage are supplied to the limit mode selector circuit.

2.3.2 Limit mode selector circuit

As mentioned previously, limit signals are respectively produced for the H lever and V lever, however, there is a case that one of them is not necessary for some wipe patterns. Therefore, the limit mode selector circuit selects limit signal(s) corresponding to the selected wipe pattern.

See Fig. 2-8.

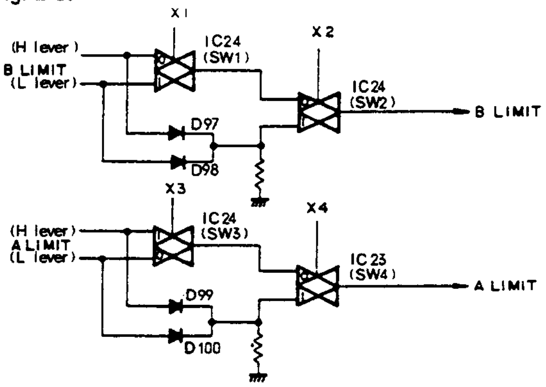


Fig. 2-8

SW1 is a selector switch which determines whether B LIMIT signal of the H. FADER lever or that of the V. FADER lever should be selected. In the same manner, a selector switch SW3 determines to select one of A LIMIT signals. D97, D98 and D99, D100 respectively make up OR circuits which synthesize H and V LIMIT signals.

SW2 (SW4) is a selector switch which selects output of SW1 (SW3) or composite LIMIT signal of H and V signals.

These switches SW1, SW2, SW3 and SW4 are controlled by control signals X1 to X4 whose effectivenesses are limited as shown in Table 2-10.

Table 2-10

Effective lever Control signal	H lever only	V lever only	H & V levers
X1	L	H	L
X2	L	L	H
X3	H	L	L
X4	L	L	H

Signals of X1, X2, X3 and X4 are yielded by decoding WIPE PATTERN SELECT signals, which are outputs of the latch circuit as described in Sect. 2.2.3 - 2).

Table 2-11 shows relation between wipe patterns and control signals.

Table 2-11

	MIX /KEY	◧	⬒	◲	◳	◪	◱	◩	◪	◫	⊟	◙	◈	⊙
X1			H								H			
X2				H	H	H	H					H		
X3	H	H						H	H	H			H	H
X4				H	H	H	H					H		

(All blanks are interpreted as logic "L".)

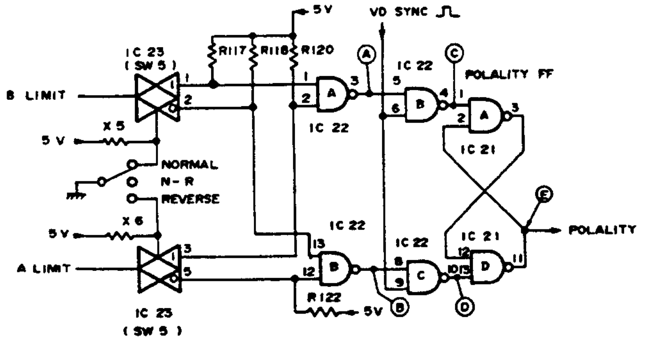
Both A LIMIT and B LIMIT signals obtained at the above stage are supplied to the next circuits of the following.

- Tally circuit
- LD1 and LD2 (both are MIX/SE lever's LEDs) on the SB board
- Polarity signal generator circuit

2.3.3 Polarity signal generator circuit

To wipe A BUS LINE and B BUS LINE signals, it is required to control the direction to wipe.

Signal to control the direction is called the polarity signal, which is generated by the circuit shown in Fig. 2-9.



For Ⓐ – Ⓔ, see waveforms in Fig. 2-10.

Fig. 2-9 Polarity signal generator circuit

A LIMIT signal becomes "L" when the MIX/SE lever is set to the full extent of the B side, while B LIMIT signal becomes "L" when the lever is set to the full extent of the A side.

Control signals X5 and X6 for SW5 and SW6 are supplied from the N/N-R/R switch of the SB board.

Table 2-12 shows conditions of X5 and X6 which depend on the mode of the N/N-R/R switch.

Table 2-12

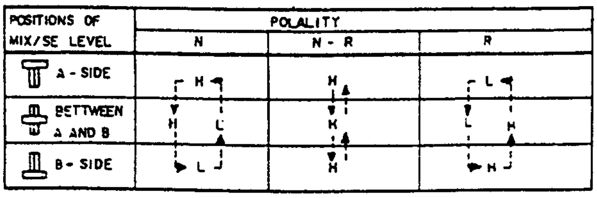
	NORMAL	NORMAL-REVERSE	REVERSE
X5	L	H	H
X6	H	H	L

During generation of VD sync. signal which is supplied to pin 1 of IC22-B/C, the gate opens to send the signal to the RS flip-flop circuit composed of IC21-A/B.

Owing to this circuit the signal level is inverted every generation of A LIMIT and B LIMIT signals.

Fig. 2-10 illustrates relation between the MIX/SE lever positions and sectional logics by mode, while relation between the MIX/SE lever positions and polarity outputs are shown in Table 3-13.

Table 2-13



POSITIONS OF MIX/SE LEVEL	POLALITY N	POLALITY N - R	POLALITY R
A - SIDE	H	H	L
BETTWEEN A AND B	H / L	H	L / H
B - SIDE	L	H	H

However, when ▨, ▨ or ▨ is selected as the wipe pattern and the positioner is set to "ON", X5 and X6 shown in the table 2-12 are forcibly switched to "H" and the polarity signal is fixed at "H" level. In other words, this means the set enters in the N-R mode.

Polarity signal is supplied to the data selector of the transmitter.

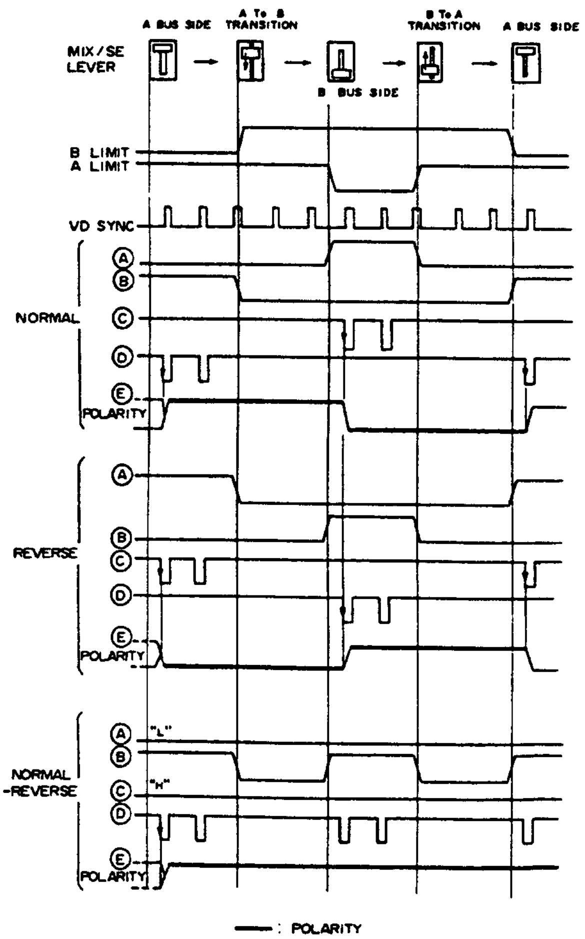


Fig. 2-10 Generation of polarity signal

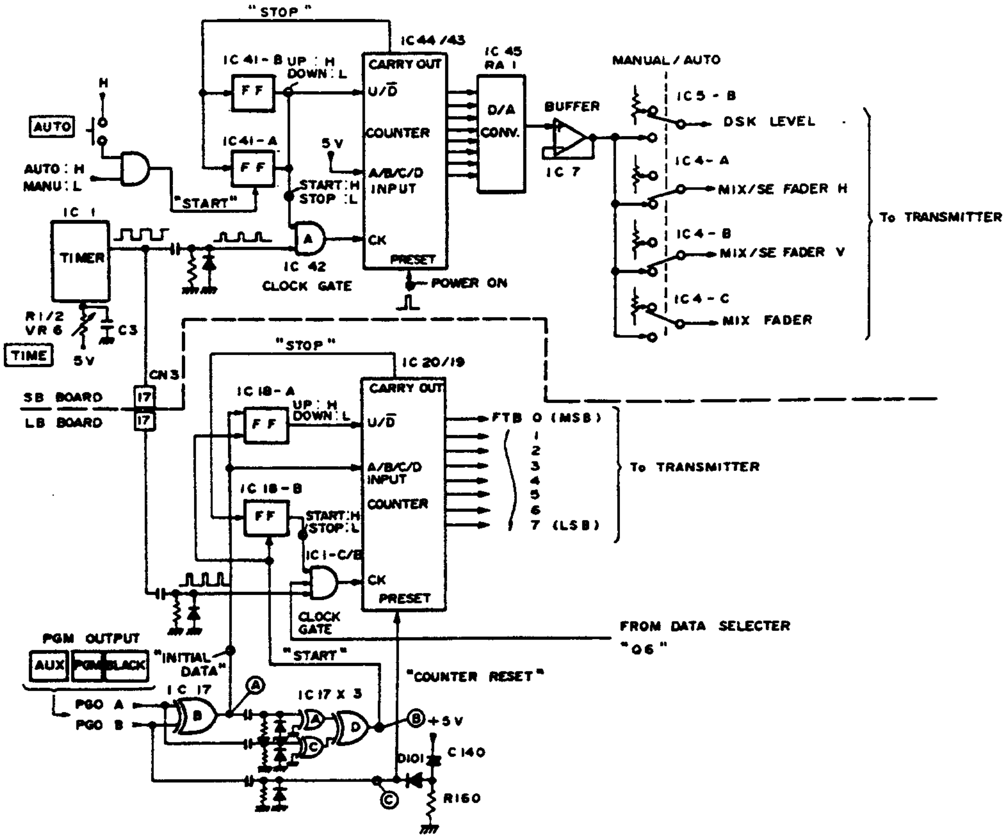

"STOP"
IC 41-B
UP : H
DOWN : L
IC44/43
IC 45
RA 1
MANUAL / AUTO
H
AUTO
FF
U/D̄
D/A
CONV.
BUFFER
IC 5-B
DSK LEVEL
IC41-A
COUNTER
5V
AUTO : H
MANU : L
START : H
STOP : L
A/B/C/D
INPUT
IC 7
IC 4-A
MIX/SE FADER H
"START"
IC 1
TIMER
A
CK
PRESET
IC 42
CLOCK GATE
POWER ON
IC 4-B
MIX/SE FADER V
To TRANSMITTER
R1/2
VR 6
C3
TIME
5V
IC 4-C
MIX FADER
CN3
SB BOARD
LB BOARD
17
17
"STOP"
IC 20/19
CARRY OUT
IC 18-A
IC 18-B
FTB 0 (MSB)
1
2
3
4
5
6
7 (LSB)
To TRANSMITTER
IC 1-C/B
CLOCK GATE
FROM DATA SELECTER
"06"
PGM OUTPUT
AUX
PGM
BLACK
"INITIAL DATA"
"START"
"COUNTER RESET"
IC 17
Ⓐ
IC 17 X 3
PGO A
PGO B
B
D
C
Ⓑ
+5V
D101
C140
Ⓒ
R160

Fig. 2-11 AUTO circuit (for Ⓐ – Ⓒ, see waveforms in Fig. 3-12)

2.4 AUTO CIRCUIT (SB/LB board)

This circuit automatically switches EFFECT operations on/off. Preset of switching time can be done by the TIME control on the control panel.

Fig. 2-11 is a block diagram of the AUTO circuit.

Automatic operations are available to turn on/off DSK, to control MIX/SE lever voltage, MIX lever voltage, and Fade-to-Black operation.

The circuit is mainly composed of the counter and its control circuits. The counter starts countup or countdown by triggering to synchronize it with the clock pulse.

Output of the counter is used as data of MIX or MIX/SE lever, DSK level and Fade-to-Black, and the counter's operation time is set by varying oscillation frequency of the clock pulse.

2.4.1 Clock (count pulse) generator (SB board)

IC1 on the SB board is a timer circuit which generates clock pulse corresponding to external time constant which is set by R1/R2, VR6 and C3. VR6 is the TIME control on the control panel.

Generated clock pulse is utilized as the count pulse for the counter.

The AUTO circuit is provided in two systems since there is a little difference between the circuit operation for DSK level, MIX/SE lever, MIX lever and that for Fade-to-Black, however, the clock pulse is used in common to the both systems.

2.4.2 AUTO circuit for DSK LEVEL, MIX/SE lever, MIX lever (SB board)

Prior to entering the counter, clock pulse passes through the clock gate (IC42-A) which is controlled by a flip-flop circuit (IC41-A).

When the AUTO button on the control panel is pressed, trigger pulse is generated to reset IC41-A output to "H". This "H" signal opens the clock gate to supply clock pulse to the counter, and then the counter starts operation.

IC44 and IC43 are 4-bit binary counters respectively, and the cascade connection of the two ICs enables them to function as an 8-bit counter. By turning on the power, pulse is sent to the PRESET terminal and initial data for count starting is accordingly input to the counter through the A/B/C/D INPUT. At this stage, the 8-bit initial data is "H H H H H H H H".

IC41-B of a flip-flop circuit determines and controls countup or countdown operation, and countdown takes place at the time of power on. Consequently, when the AUTO button is pressed for the first time after the power is turned on, the counter starts countdown synchronizing the initial data "H H H H H H H H" with the clock pulse.

When the counter finishes to count down to "L L L L L L L L" of the counter output, CARRY OUT signal is produced, and is supplied to IC41-A to set its output to "L". As a result, the clock gate is closed and the counter stops operation.

At the same time, the CARRY OUT signal is supplied to IC41-B to invert its output, and the counter is accordingly set for countup operation. Therefore, at the second time of the AUTO ooperation, counter output changes from "L L L L L L L L" to "H H H H H H H H".

As stated above, counting mode is turned to countup or countdown every AUTO operation.

Counter output is converted into DC voltage of 0–5 V by the R-2R type D/A converter composed of IC45 and RA1, and converted DC voltage is supplied to the analog switch IC5-B, IC4-A/B/C via the buffer IC7.

IC5-B and IC4-A/B/C respectively select the MANUAL level and AUTO level and send selected signals to the data selector of the transmitter.

2.4.3 FADE-TO-BLACK AUTO circuit (LB board)

The clock pulse generated in the SB board flows not only inside the SB board but also to the LB board to be used for the FADE-TO-BLACK AUTO circuit.

The circuit structure for this purpose is nearly the same as that for the other AUTO circuit mentioned above, therefore, the following describes different points only.

FADE-TO-BLACK (FADE-OUT) operation starts by pressing the "BLACK" of the PGM OUTPUT SELECT buttons on the control panel. If the "PGM" button is pressed after or in the course of fade-out operation, fade-in takes place. On the other hand, if operation is switched from "PGM" or "BLACK" to "AUX", and vice versa, the current picture momentarily changes despite of the preset time by the TIME control.

The counter control circuit is designed to realize such the function as stated above.

The exclusive OR gates (IC17-A/B/C/D) constitute the FTB counter control circuit, which is controlled by the PGO A/B of PGM OUTPUT SELECT signals (see Sect. 2.2.4).

The control outputs are three of the following.

- Initial data at count start and counting mode control signal (Ⓐ)
- Count start trigger pulse (Ⓑ)
- Count data preset trigger pulse (Ⓒ)

For (Ⓐ,Ⓑ,Ⓒ), see waveforms shown in Fig. 2-11.

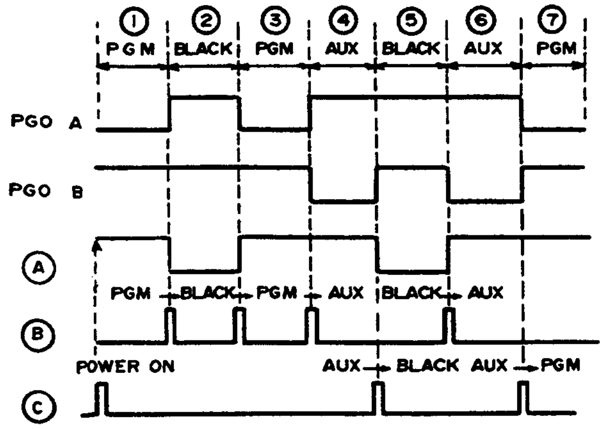


Fig. 2-12 Outputs of FTB counter control circuit

These outputs are produced when any one of the "AUX", "PGM" and "BLACK" buttons, however, respective generation modes change depending on the buttons pressed prior to the current operation button.

Fig. 2-12 illustrates changes in the control outputs by pressed button. The following explains the change in the order of the steps shown in the figure.

① After the power is turned on, C140, R160 and D101 generate a pulse for preset input of the initial data at starting the counting.
Since the PGM OUTPUT SELECT button is fixed to "PGM" after the power is turned on, the initial data is "H H H H H H H H".

② When the "BLACK" is pressed, count start trigger pulse Ⓑ is generated to start the counter. Since Ⓐ is "L", the counting mode is set for countdown.

H H H H H H H H Count start
H H H H H H H L
H H H H H H L H
. Countdown
:
:
L L L L L L L L Count stop

When the input data becomes "L L L L L L L L", the counter stops counting in the same manner as in the AUTO circuit stated in Sect. 2.4.2.

③ After "BLACK" button pressed, pressing "PGM" again enables the counter to start countup because the control signal Ⓐ is "H" at this time.
At this time the initial data of the counteer is not changed because of no preset trigger pulse Ⓒ generated. This function starts fade-in with the data at the moment of pressing "PGM" button if the "PGM" is pressed in the course of fade-out which is started by the "BLACK" button.

④ In case of switchover from "PGM" to "AUX", the control signals Ⓐ to Ⓒ are not used because the VIDEO board of the main unit momentarily changes the image. If it is performed in the course of fade-in or fade-out operation, the counter continues counting notwithstanding the switchover, however, the counting has no effect on the operation since the picture is produced by AUX video input in this case.

⑤ If the "BLACK" button is pressed in the "AUX" mode, the picture must be darkened momentarily. For realizing this effect, preset trigger pulse Ⓒ is generated to send the initial data Ⓐ "L L L L L L L L" to the counter. At this time no start trigger pulse Ⓑ is generated and the data "L L L L L L L L" immediately enters the transmitter as the output data.

⑥ If the "AUX" button is pressed in the condition that the "BLACK" button has been pressed, the control signals Ⓐ to Ⓒ are not used from the same reason as stated in the above step ④.

⑦ In case of switchover from "AUX" to "PGM", the image is momentarily changed by the same operation as stated in the above step ⑤, however, the initial data Ⓐ is "H H H H H H H H" at this time.

2.5 TALLY SIGNAL GENERATOR CIRCUIT (LB board)

Tally signal can be yielded by decoding BUS SELECT signals (A, B, PGM, PST).

The decoder is composed of IC70, 60, 46 and 34, and these ICs function respectively for the BUS line corresponding to each. Every decoder (IC) receives SELECT signal of the BUS line corresponding to it, and the output is collected together with others to be supplied to the data selector of the transmitter as the tally data "TLY1–8".

The decoder to be used is selected depending on the condition resulting from the button pressed and set position of control levers. IC69, 59 and 45 constitute a logic circuit to control the decoders.

The control circuit is shown in Fig. 2-13, and the decoder to be used is selected by controlling the decoders' INH inputs.

Since the TALLY circuit comes in operation in some kinds of cases, relation between the setting of buttons/levers and the decoder(s) to be used is shown in Table 2-14.

Table 2-14

Setting of Buttons & Levers				Decoder(s) in Effect			
				A	B	PGM	PST
PROGRAM BUS BUTTONS	1 - 8			×	×	O	↑
	SE	MIX / SE A		O 1-8	×	×	*PST
		A I B		O 1-8	O 1-8	×	
		B		×	O 1-8	×	↓
PRESETS BUS BUTTONS	1 - 8			← *PGM			O
	SE	MIX / SE A	MIX lever is set halfway. MIX LEVER 	O 1-8	×	↓	×
		A I B		O 1-8	O 1-8		×
		B		×	O 1-8	↓	×

O : Operates.
X : Doesn't operate.
1-8 : Doesn't operate when "COLOR" is selected.
*PST : Depends on setting of PRESET BUS buttons
*PGM : Depends on setting of PROGRAM BUS buttons

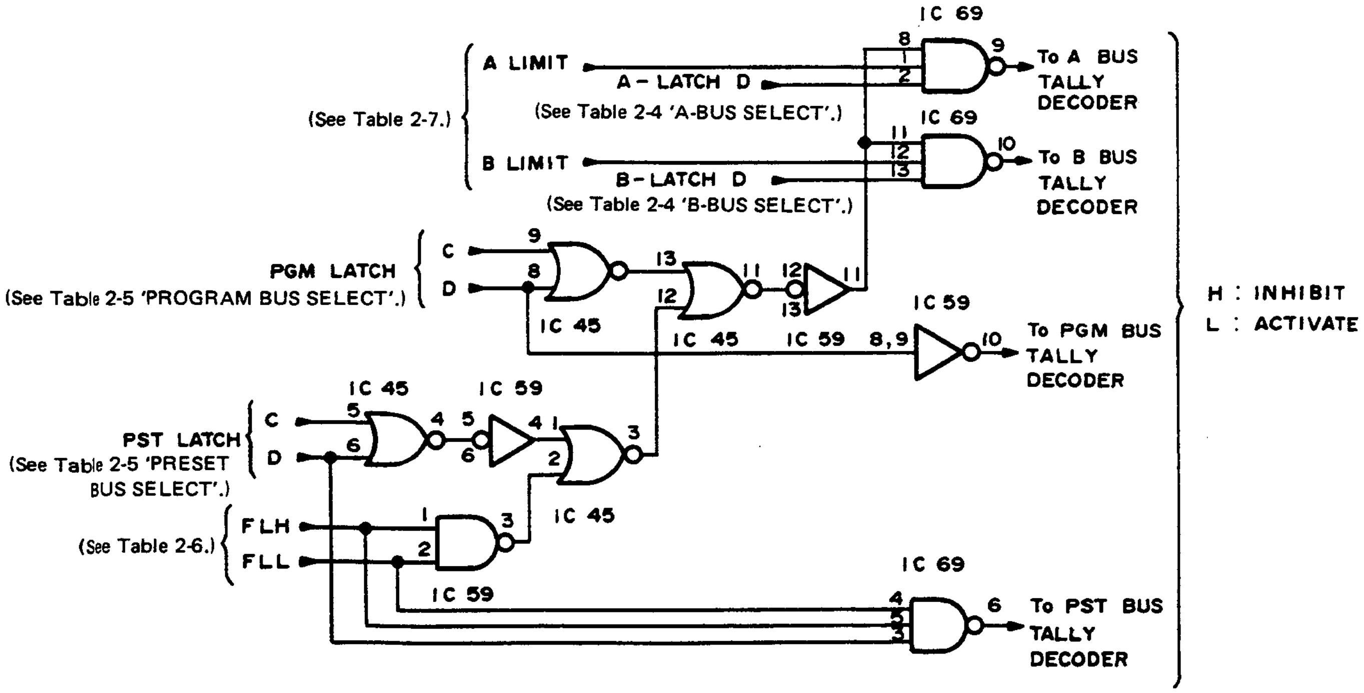

IC 69
A LIMIT
A - LATCH D
(See Table 2-7.)
(See Table 2-4 'A-BUS SELECT'.)
B LIMIT
B - LATCH D
(See Table 2-4 'B-BUS SELECT'.)
8
1
2
9
To A BUS TALLY DECODER
IC 69
11
12
13
10
To B BUS TALLY DECODER
PGM LATCH
(See Table 2-5 'PROGRAM BUS SELECT'.)
C
D
9
8
IC 45
13
12
11
IC 45
12
13
11
IC 59
IC 59 8,9
10
To PGM BUS TALLY DECODER
H : INHIBIT
L : ACTIVATE
PST LATCH
(See Table 2-5 'PRESET BUS SELECT'.)
C
D
IC 45
5
6
4
IC 59
5
6
4
1
2
3
IC 45
FLH
FLL
(See Table 2-6.)
1
2
3
IC 59
IC 69
4
5
3
6
To PST BUS TALLY DECODER

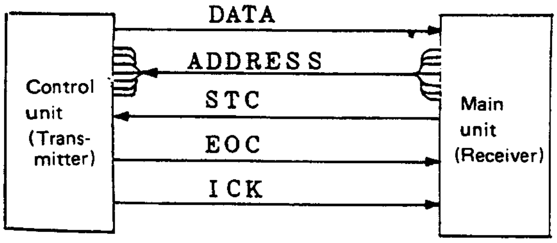
Fig. 2-13

3. CONTROL DATA TRANSMISSION SYSTEM

Since the KM-2500 as well as KM-2000 adopts the 2-unit system to separate the control unit from the main unit, it needs to transmit data between the two units.
In the KM-2000 for a reference, data are transmitted to the parameters as they are analog values, therefore, the transmission distance is limited within 5 m. In KM-2500, on the other hand, it extends up to 10 m since all data are digitalized and sent by serial transmission.

3.1 OUTLINE OF THE SYSTEM

The control data transmission system is mainly composed of a transmitter built in the control unit and a receiver built in the main unit.
The data transmission system is made up by sequential circuits of hard logical operation, therefore, it is not controlled by CPU. This circuit structure has a demerit of complicacy but is superior in operational reliability.
There are five kinds of signal lines provided for data transmission between the main unit and the control unit (see Fig. 3-1).
Control clock pulses are respectively generated by the transmitter and the receiver, and they are asynchronous with each other.



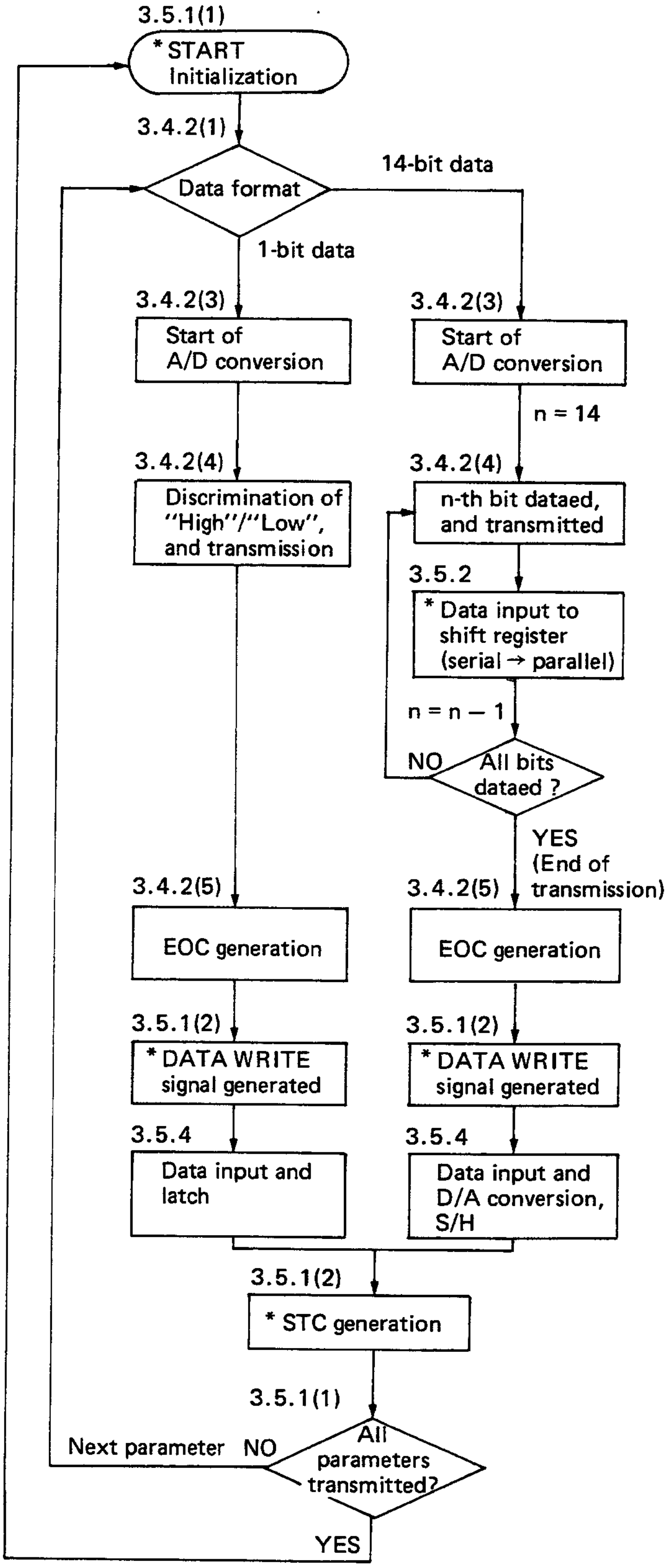
DATA
ADDRESS
STC
EOC
ICK
Control unit (Transmitter)
Main unit (Receiver)

Fig. 3-1

- DATA
  Digitalized serial data whose length changes depending on the parameter.
- ADDRESS
  7-bit address signal to select parameters to transmit/receive data. The upper 4 bits are used for address assignment of parameters while the lower 3 bits for channel address assignment.
- STC (Start of conversion)
  Generated every time data received by the main unit is latched to a parameter corresponding to the input data. At the same time, this commands the transmitter to send the next data to the control unit.
- EOC (End of conversion)
  Generated in the control unit every time it sends data for a parameter, and at the same time this signal requests the main unit to latch the data.
- ICK
  Control clock pulse not only used inside the transmitter but also supplied to the receiver, in which this signal is used for the shift register which converts serial data into parallel data.

3.2 OUTLINE OF OPERATION

The operation flowchart of Fig. 3-2 shows sequential operations of the transmitter and the receiver.



3.5.1(1)
* START
Initialization
3.4.2(1)
Data format
14-bit data
1-bit data
3.4.2(3)
Start of A/D conversion
3.4.2(3)
Start of A/D conversion
n = 14
3.4.2(4)
Discrimination of "High"/"Low", and transmission
3.4.2(4)
n-th bit dataed, and transmitted
3.5.2
* Data input to shift register (serial → parallel)
n = n − 1
NO
All bits dataed ?
YES (End of transmission)
3.4.2(5)
EOC generation
3.4.2(5)
EOC generation
3.5.1(2)
* DATA WRITE signal generated
3.5.1(2)
* DATA WRITE signal generated
3.5.4
Data input and latch
3.5.4
Data input and D/A conversion, S/H
3.5.1(2)
* STC generation
3.5.1(1)
Next parameter NO
All parameters transmitted?
YES

* Operation in the receiver
(without * mark = operation in the transmitter)

Fig. 3-2 Operation flowchart

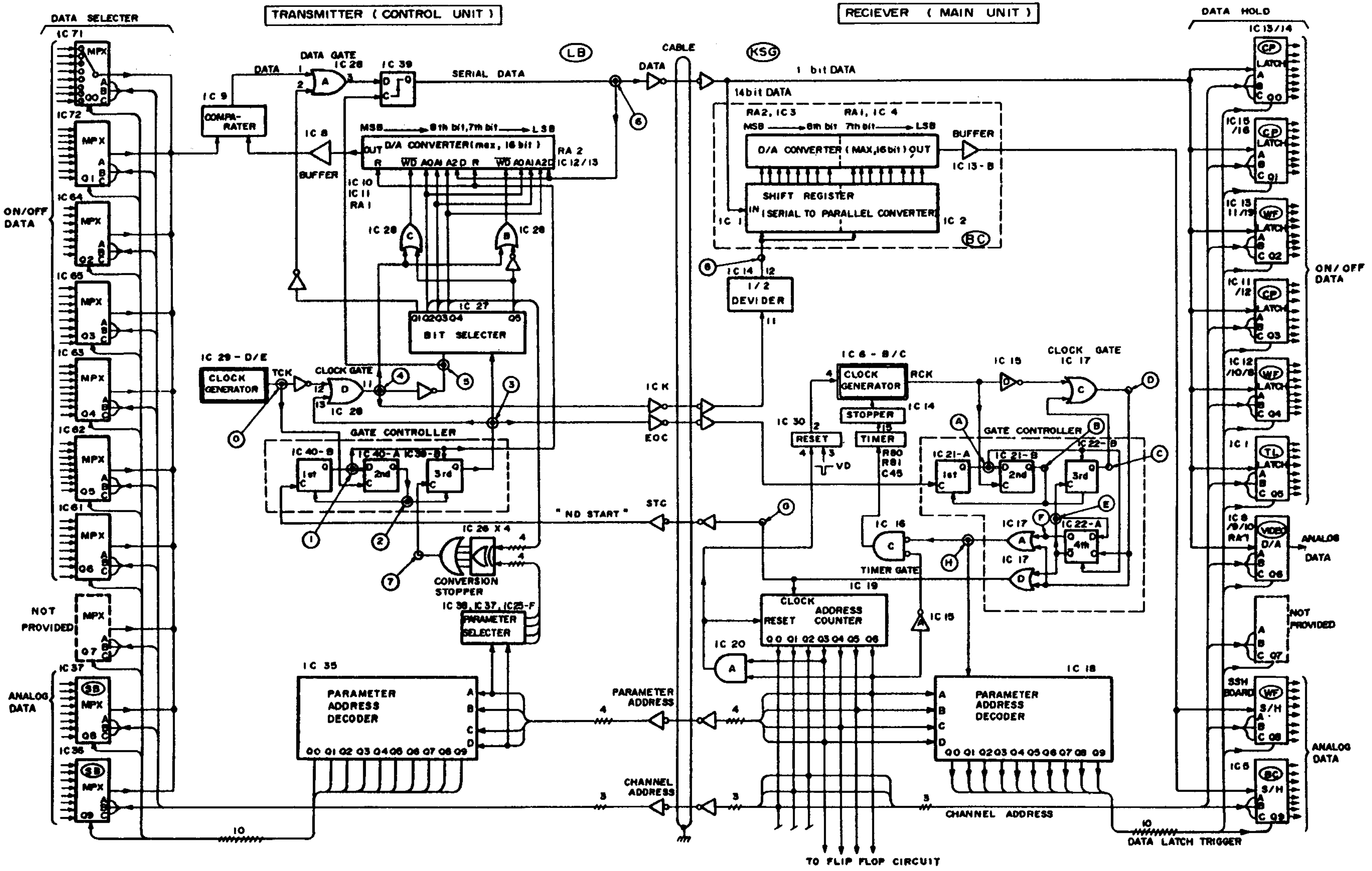

DATA SELECTER
TRANSMITTER (CONTROL UNIT)
RECIEVER (MAIN UNIT)
DATA HOLD
IC 71
MPX
IC 72
IC 64
IC 65
IC 63
IC 62
IC 61
IC 37
IC 36
ON/OFF DATA
NOT PROVIDED
ANALOG DATA
IC 9
COMPA-RATER
DATA
DATA GATE
IC 28
IC 39
SERIAL DATA
LB
CABLE
KSG
1 bit DATA
14bit DATA
IC 8
BUFFER
MSB
8th bit,7th bit
LSB
D/A CONVERTER(max, 16 bit)
OUT
RA 2
IC 12/13
IC 10
IC 11
RA 1
IC 28
IC 27
BIT SELECTER
IC 29 - D/E
CLOCK GENERATOR
TCK
CLOCK GATE
IC 28
GATE CONTROLLER
IC 40-B
IC 40-A
IC 38-B
1st
2nd
3rd
"ND START"
IC 28 X 4
CONVERSION STOPPER
IC 38, IC 37, IC 25-F
PARAMETER SELECTER
IC 35
PARAMETER ADDRESS DECODER
ICK
EOC
STC
PARAMETER ADDRESS
CHANNEL ADDRESS
RA2, IC 3
RA1, IC 4
D/A CONVERTER (MAX,16bit) OUT
BUFFER
IC 13 - B
SHIFT REGISTER
(SERIAL TO PARALLEL CONVERTER)
IC 1
IC 2
BC
IC 14
1/2
DEVIDER
IC 6 - B/C
CLOCK GENERATOR
RCK
STOPPER
IC 14
IC 30
RESET
TIMER
R80
R81
C45
VD
IC 15
CLOCK GATE
IC 17
IC 21-A
IC 21-B
IC 22-B
IC 22-A
4th
IC 16
TIMER GATE
IC 19
CLOCK
ADDRESS COUNTER
RESET
IC 20
IC 18
CHANNEL ADDRESS
TO FLIP FLOP CIRCUIT
DATA LATCH TRIGGER
IC 13/14
IC 15/16
IC 13 11/19
IC 11/12
IC 12/10/8
IC 1
IC 8/9/10 RA1
SSH BOARD
IC 5
CP
WF
TL
VIDEO
SB
BC
LATCH
D/A
S/H

Fig. 3-3 Control data transmission system

3.3 DATA FORMAT (Sorts of Data)

Table 3-1 shows parameters sent from the transmitter.

Parameters are selected by respective parameter addresses and channel addresses.

Parameters can be classified into two main groups. One is what are originarlly generated as digitalized codes such as data of buttons' ON/OFF state and time data of Fade-to-Black. The 1-bit data in the Table correspond to it.

The other group contains data of digitalized codes which are converted from those originarlly generated as 0—5 V DC analog data such as setting positions of controls and levers. The 14-bit data in the Table corresponds to it.

Parameters are transmitted in series one bit by another in the order shown in the Table.

3.4 TRANSMITTER OPERATION (LB board)

In the operation of the transmitter, transmission of 1 loop, namely, 1 parameter, starts as start trigger pulse (STC) is received while ends as end trigger pulse (EOC) is transmitted. This operation is repeated for every parameter.

In this process the transmitter performs A/D conversion of data and sends converted data to the receiver.

The circuit of the transmitter can be divided roughly into two sections of the data selector and the A/D converter.

3.4.1 Data selector (LB board, SB board)

The data selector is composed of 9 8-channel multiplexers and an address decoder.

The multiplexers receive data of parameters (shown in Table 3-1) by the channel. One of input data is selected by the ADDRESS signal to be supplied to the A/D converter.

As stated above, ADDRESS signals are classified into two kinds — 1-bit data and 14-bit data. Parameter ADDRESS signals are supplied to the address decoder IC35 to be converted selective signals Q0—Q9 ("L" for selection) which select one of 9 multiplexers. On the other hand, channel ADDRESS signals select one from 8 channels of a selected multiplexer.

Signals of parameter address and channel address start the receiver to count up every generation of STC signal (will be mentioned later) and to select next parameter.

3.4.2 A/D converter (LB board)

The A/D converter functions in two ways.

One is to send 1-bit data which are originally generated as digital data of 0 or 5 V DC to the receiver. In this operation, the A/D converter is used to discriminate between "High" and "Low" of input data.

The other is to convert analog data of 0—5 V DC into 14-bit digital codes first and then to send the data to the receiver one bit by another (refer to 3.3).

The circuit configuration is a sequential comparator type as same as that of the KM-3000, and that is composed of the clock oscillator, gate controller, comparator, data latch circuit and D/A converter, etc.

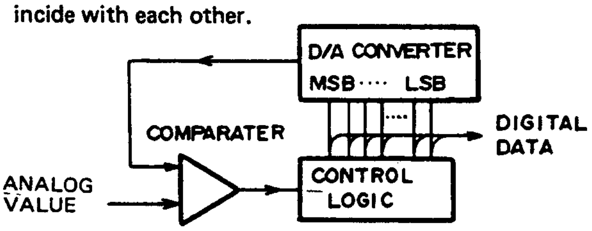
The following describes the the order of operations.

See the block diagram (Fig. 3-3) and the timing chart (Fig. 3-4).

Reference

Basic operation of sequential comparison type A/D converter

The sequential comparison type A/D converter is equipped with a built-in D/A converter. The A/D converter compares the D/A converter's output and analog data to be converted, and set obtained data starting from the MSB to LSB as the two data coincide with each other.



The following are practical operations.

1. All bits of digital data are reset to "0".
2. Simultaneously with conversion start, MSB is set to "1", whose data is processed in D/A conversion and compared with the analog value by the comparator.
3. If D/A-converted value is larger, the data is reset to "0", while, if it is smaller, the data is set to "1" still.
4. Next, the bit just one step lower than the MSB is set to "1", and then data are set in the same manner as the steps 2. and 3.
5. Reminders of data including the LSB are set in the same procedure.

If the process to set a bit in the above manner is named "1 stage", the same number of "stages" as bits to be processed are necessary.

In the KM-2500, therefore, 1-bit data needs 1 stage, and 14-bit data needs 14 stages.

1. Parameter discriminator

The parameter discriminator discriminates between 1-bit and 14-bit of parameter data. On the other hand, this set resolution of analog data by one bit from 1 bit to 16 bits in two ways. In the KM-2500, however, this is set for 14 bits.

The circuit composed of IC38, IC37-C/D and IC25-F is the parameter discriminator to which MSB and LSB are supplied for discrimination.

As shown in Table 3-1, MSB of parameter address is "0" in case of 1-bit data while it is "1" in case of 14-bit data. MSB and LSB are utilized for discrimination in such the manner.

LSB is used to select one of two resolutions of alanog data. The resolution is set by utlizing input data to IC38 A1 to A4 and B1 to B4. In case LSB is "0" (group of Q8), data of A1—A4 is utilized, while if it is "1" (group of Q9), data of B1—B4 is utilized.

Outputs of the discriminator (IC38, D1—D4) are shown in Table 3-2. These outputs are supplied to the conversion stopper.

Table 3-1 Kinds of parameters to be transmitted

TRANSMITTER					RECEIVER			CONTROL PANEL
Parameter Address	Channel Address	Parameter		Data Format	Destination from Data Hold Circuit			Button SW No. (See Fig. 2-1)
D C B A	C B A				PC Board	Signal Name		
0 0 0 0 [Q0]	0 0 0	A LATCH	A	1-bit data	CP	A BUS SELECT	A	No. 1–9
	0 0 1		B				B	
	0 1 0		C				C	
	0 1 1		D				INH	
	1 0 0	B LATCH	A			B BUS SELECT	A	No.10–18
	1 0 1		B				B	
	1 1 0		C				C	
	1 1 1		D				INH	
0 0 0 1 [Q1]	0 0 0	PGM LATCH	A		CP	PGM BUS SELECT	A	No. 19–28
	0 0 1		B				B	
	0 1 0		C				C	
	0 1 1		D				INH	
	1 0 0	PST LATCH	A			PST BUS SELECT	A	No. 29–38
	1 0 1		B				B	
	1 1 0		C				C	
	1 1 1		D				D	
0 0 1 0 [Q2]	0 0 0	SFT (Softness)	A		WF	SOFTNESS CONT	A	No. 72
	0 0 1		B				B	
	0 1 0		C				C	
	0 1 1	POL (Polarity)				POLARITY		No. 64
	1 0 0	WML (Wipe Mode Latch)	A			WIPE CODE	A	No. 41–54
	1 0 1		B				B	
	1 1 0		C				C	
	1 1 1		D				INH	
0 0 1 1 [Q3]	0 0 0	EX DSK			CP	(EXT DSK ON/OFF)		
	0 0 1	PGL B (PGM OUT LATCH B)				(PGM OUT Select B)		No. 55–57
	0 1 0	PVS (Preview SUPER)				(Preview SUPER ON/OFF)		No. 40
	0 1 1	PVD (Preview DSK)				(Preview DSK ON/OFF)		No. 39
	1 0 0	CK SEL (Chroma Key Select)	A			(Chroma Key Select)	A	No. 71
	1 0 1		B				B	
	1 1 0		C				C	
	1 1 1	EK/CK (EXT Key/Chroma Key)				(EXT Key/Chroma Key Select)		
0 1 0 0 [Q4]	0 0 0	MIX/SE			CP	CHROMA KEY ON/OFF (MIX/SE)		No. 59
	0 0 1	MIX			VIDEO	CHROMA KEY ON/OFF (MAX)		
	0 1 0	EDGE			BC/WF	EDGE ON/OFF		No. 67
	0 1 1	BC/CB (Back Color/Color Bars)			BC	BC/CB Sw		No. 60
	1 0 0	BC (Back Color)				BC ON/OFF		
	1 0 1	BDR (Border)			WF	BORDER ON/OFF		No. 63
	1 1 0	N/P (NEGA/POSI)				(DSK NEGA/POSI Select)		No. 66
	1 1 1	POSI (Positioner)				POSI ON/OFF (Positioner)		No. 65
0 1 0 1 [Q5]	0 0 0	TLY (Tally)	1 (INPUT 1)		TL	(Tally Driver)	1	No. 19–26
	0 0 1		2 (INPUT 2)				2	
	0 1 0		3 (INPUT 3)				3	
	0 1 1		4 (INPUT 4)				4	
	1 0 0		5 (INPUT 5)				5	
	1 0 1		6 (INPUT 6)				6	
	1 1 0		7 (INPUT 7)				7	
	1 1 1		8 (INPUT 8)				8	

Note: Inside of square brackets [ ] shows selection output of data selector.

Table 3-1 (continued)

TRANSMITTER				RECEIVER		CONTROL PANEL
Parameter Address	Channel Address	Parameter	Data Format	Destination from Data Hold Circuit		Button SW No. (See Fig. 2-1.)
D C B A	C B A			PC Board	Signal Name	
0 1 1 0 [Q6]	0 0 0	0 (MSB)	1-bit data	VIDEO	(Fade to Black control voltage)	
	0 0 1	1				
	0 1 0	2				
	0 1 1	FTB 3				
	1 0 0	(Fade to Black) 4				
	1 0 1	5				
	1 1 0	6				
	1 1 1	7 (LSB)				
0 1 1 1 [Q7]	0 0 0	UNUSED			UNUSED	
	0 0 1					
	0 1 0					
	0 1 1					
	1 0 0					
	1 0 1					
	1 1 0					
	1 1 1					
1 0 0 0 [Q8]	0 0 0	(CHROMA KEY SLICE)	14-bit data	CP	CHROMA KEY SLICE	
	0 0 1	(CHROMA KEY FINE)			CHROMA KEY FINE	
	0 1 0	(DSK SLICE)		WF	DSK SLICE	
	0 1 1	(SUPER LEVEL)		VIDEO	SUPER LEVEL	
	1 0 0	(POSITIONER H)		WF	(POSITIONER H)	
	1 0 1	(MIX/SE FADER H)		WF/BNC	RAMP 1 (ASPECT X)	
	1 1 0	(MIX/SE FADER V)			RAMP 2 (ASPECT Y, MIX)	
	1 1 1	(POSITIONER V)		WF	(POSITIONER V)	
1 0 0 1 [Q9]	0 0 0	(DSK LUM)		BC	(DSK LUM)	
	0 0 1	(DSK SAT)			(DSK SAT)	
	0 1 0	(DSK HUE)			(DSK HUE)	
	0 1 1	(BACK COLOR LUM)			(BACK COLOR LUM)	
	1 0 0	(BACK COLOR SAT)			(BACK COLOR SAT)	
	1 0 1	(BACK COLOR HUE)			(BACK COLOR HUE)	
	1 1 0	(MIX FADER)			(MIX FADER)	
	1 1 1	(PSK LEVEL)		VIDEO	(DSK LEVEL)	

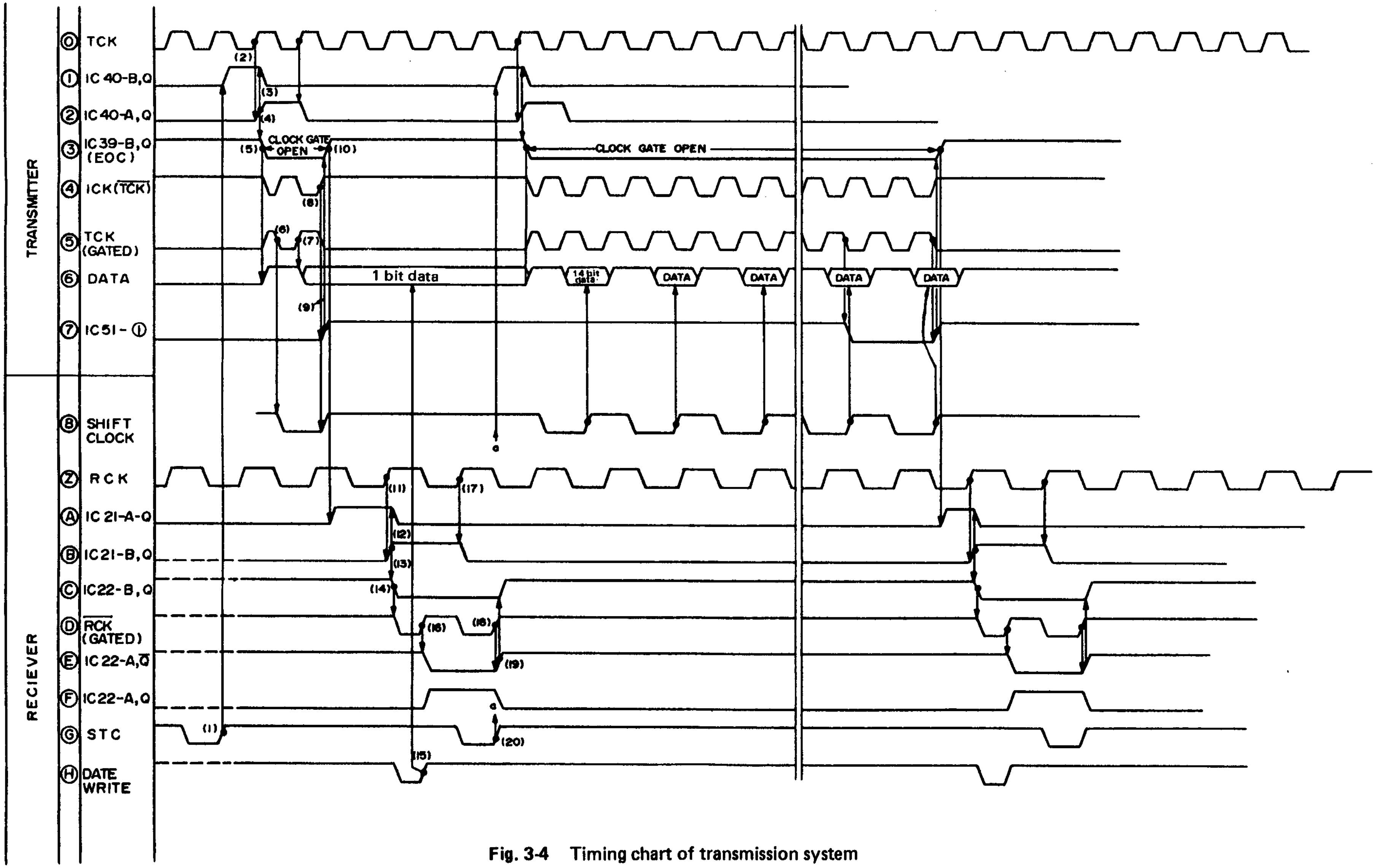

TRANSMITTER
RECIEVER
⓪ TCK
① IC 40-B,Q
② IC 40-A,Q
③ IC 39-B,Q (EOC)
④ ICK($\overline{TCK}$)
⑤ TCK (GATED)
⑥ DATA
⑦ IC51 - ①
⑧ SHIFT CLOCK
Ⓩ RCK
Ⓐ IC 21-A-Q
Ⓑ IC21-B,Q
Ⓒ IC22-B,Q
Ⓓ $\overline{RCK}$ (GATED)
Ⓔ IC 22-A,$\overline{Q}$
Ⓕ IC22-A,Q
Ⓖ STC
Ⓗ DATE WRITE
(1)
(2)
(3)
(4)
(5)
CLOCK GATE OPEN
(10)
(6)
(7)
(8)
(9)
1 bit data
CLOCK GATE OPEN
14 bit data
DATA
DATA
DATA
DATA
a
(11)
(12)
(13)
(14)
(15)
(16)
(17)
(18)
(19)
(20)
a

Fig. 3-4 Timing chart of transmission system

Table 3-2 Parameter discrimination outputs

Data format \ IC38	D4	D3	D2	D1
1-bit data (Group Q0 – Q7)	L	L	L	L
14-bit data (Group Q8)	*A4	A3	A2	A1
14-bit data (Group Q9)	*B4	B3	B2	B1

* In KM-2500, they are H, H, L, H (14 bits)

2. Clock oscillator
The circuit composed of IC29-D/E is the clock oscillator whose frequency is 70 kHz.
The receiver's clock RCK is asynchronous.

Timing chart
Ⓞ TCK (fixed generation)

3. Gate controller (A/D converter starter)
The 3-step flip-flop circuit composed of IC40-A/B and IC39-B is the gate controller which functions as the starter of the A/D converter.
STC Ⓖ supplied from the receiver is the trigger pulse to start converter, and it is generated every conversion of parameters.
Receiving STC Ⓖ, IC40-B (1st step) resets D/A converter output to "0", while IC39-B resets the D/A converter's bit selector outputs (Q1—Q7) to "0" at rise of STC. At the same time, the clock gate IC28-D opens to supply clock TCK Ⓞ to every part of the A/D converter.

Progress on the timing chart (in case of 1-bit data)
Ⓖ – (1) : From rise of STC
↓
③ – (5) : To fall of IC39-B, Q

4. Sequential comparator
Clock pulses ④ and ⑤ put out through the opened clock gate are supplied to the sequential comparator composed of the comparator, data latch circuit and D/A converter. The sequential comparator performs sequential comparison as stated in the "Reference".
It takes a time for 2 clocks ("1 stage" in other words) to convert 1 bit. In case of 1-bit data, consequently two clock pulses are used to discriminate between "High" and "Low", while in case of 14-bit data, A/D conversion is carried out with 28 clock pulses.
IC27 is a binary counter which functions as a bit selector. Outputs Q2 to Q5 are supplied to the data latch circuit IC11/12 via IC28-B/C, and data set bit is selected with assorted signal of Q2 to Q5.
Output Q1 is supplied to IC28-A which is a data gate to output converted data.
With the first clock ⑤ Q1 becomes "H", therefore, the data is "H", too. This data ⑥ is supplied to the data latch circuit IC11/12 and then becomes the data corresponding to the bit selected with Q2—Q5. Such the set data is immedialy supplied to the D/A converter IC10/13, RA-1/2 which converts the data into analog data. Then, the data is supplied to IC9 to be compared with the data to convert.
With the second clock ⑤, Q1 of IC27 becomes "L", therefore, IC28-A transmits data ⑥ which the comparator output ("H" or "L") is A-D converted to the receiver.

Progress on the timing chart (in case of 1-bit data)
③ – (5) : From fall of IC39-B, Q
↓
④ – (8) : To rise of ICK ($\overline{\text{TCK}}$)

5. Conversion stopper
When data conversion of a parameter finishes, the transmitter generates EOC ③ to inform the receiver that the data transmission finishes. The conversion stopper generates this EOC pulse.
The circuit composed of OR gate IC51 and exclusive OR gate IC26 (x 4) is the conversion stopper.
Those gate circuits are supplied with bit selector outputs (IC27, Q2 —Q5) and parameter discriminator outputs (IC38, D1— D4). Accordingly, in case of 1-bit data, each potential of Q5, Q4, Q3, Q2 changes from "L, L, L, L" to "L, L, L, H" and output of IC51 changes from "L" to "H" to generate trigger pulse. This trigger pulse is sent to the gate controller IC39-B (refer to the above item 3) and its output Q is generated as EOC ③.
In case of 14-bit data, trigger pulse is generated by IC51 when potentials of Q5, Q4, Q3, Q2 change from "H, H, L, H" to "H, H, H, L", and EOC is generated as a result. EOC closes the clock gate IC28-D to stop the sequential comparator's operation. At the same time, EOC is transmitted to the receiver to inform it that data transmission finishes.

Progress on the timing chart (in case of 1-bit data)
④ – (8) : From rise of ICK ($\overline{\text{TCK}}$)
↓
③ – (10): To rise of EOC

3.5 OPERATION OF RECEIVER

In the receiver, data reception of 1 loop, namely, data for 1 parameter, starts at reception of EOC and ends simultaneously with STC oscillation. This operation is repeated for every parameter. In this operation, the receiver latches input data and distributes necessary data to internal sections.

The circuit of the receiver can be classified into four main blocks: data distributor circuit, shift register, D/A converter and write control unit.

3.5.1 Write control unit (KSG board)

This unit is composed of the clock oscillator and the gate controller in main, and it oscillates data write pulse and STC.

1. Clock oscillator

   The circuit composed of IC6-B/C is the clock oscillator whose oscillation frequency is 70 kHz. The receiver operates synchronously with this clock RCK Ⓩ, but does not synchronize with the transmitter's clock TCK. When 14-bit data is converted into analog voltage, pin 15 of IC6-B is kept at "H" to stop clock oscillation for a certain time. IC14-A is the stopper.

   The time that stopper output Q is "H" is set by R80, R81 and C45. This time is set to stop clock oscillation until the sampling hold circuit after the D/A converter finishes data sampling.

   Pin 4 of IC6-B is set to "H" when all parameter data are supplied to relating boards to stop clock oscillation until the next VD pulse is supplied. IC30-A controls it, so it can be called a resetter. This supplies MSB (output of IC19 - Q6) of parameter address signal and LSB (output of IC19 - Q3) to the AND gate, which supplies its output to the reset terminal of IC30-A. When data reception of the last parameter is completed, AND output becomes "H" which resets IC30-A output to "H" to stop clock oscillation. When next VD pulse is supplied, $\overline{Q}$ becomes "L" which starts clock oscillation again to repeat data reception from the first parameter.

   The clock RCK is supplied to the gate controller.

   Timing chart

   Ⓩ RCK (fixed oscillation)

2. Gate controller

   The 4-step flip-flop circuit composed of IC21-A/B, IC22-A/B and the OR gate IC17-A/D compose the gate controller which functions to oscillate WRITE signal Ⓗ and STC Ⓖ.

   The gate controller starts operation synchronously with rise of EOC ③ signal that is supplied from the transmitter.

   When IC21-A (1st step) receives EOC ③, IC21-B (2nd step) starts with RCK Ⓩ of the next clock, and accordingly IC22-B (3rd step) starts operation. Q Ⓒ of IC22-B output opens the clock gate IC17-C, as a result, clock RCK Ⓩ is supplied to IC22-B (4th step) and OR gate IC17-A/D as clock $\overline{RCK}$ Ⓓ pulse.

   Therefore, IC17-A generates DATA WRITE Ⓗ while IC17-D generates STC Ⓖ. As shown in the timing chart, DATA WRITE Ⓗ is generated with the first clock RCK Ⓩ after input of EOC ③, and STC Ⓖ is generated with the next clock pulse.

   DATA WRITE Ⓗ is supplied to the address decoder of the data distributor circuit, while STC Ⓖ is supplied to the transmitter to inform it that data reception finishes besides it is supplied to the address counter of the data distributor circuit.

   Progress on the timing chart

   ③ – (10) : From rise of EOC
   ↓
   Ⓗ – (15) : To rise of DATA WRITE and
   Ⓖ – (20) : To rise of STC

3.5.2 Shift register (BC board)

Since analog data which are converted into 14-bit digital data in the transmitter are supplied in series, it is required to convert them into parallel data by the shift register before the D/A converter converts them into analog data. 14-bit data are supplied in the order starting from MSB. The shift register IC1/2 receives data ⑥ which are supplied one bit by another in good time of SHIFT CLOCK ⑧ and converts them into parallel data. SHIFT CLOCK ⑧ is produced by dividing clock ICK ④ into half by IC14 of the KSG board. As shown in the timing chart, this is generated on receiving data sent by the transmitter.

SHIFT CLOCK ⑧ is generated at a time when 1-bit data ⑥ is transmitted, but it is not used in this set.

Timing chart

⑧ SHIFT CLOCK : At rise of this pulse, DATA ⑥ is supplied to the shift register.

3.5.3 D/A converter (BC board)

IC3/4 and RA1/2 which are buffer registers and R-2R ladder resistors respectively compose the D/A converter. Simultaneously with parallel data output by the shift register, this puts out analog data corresponding to the parallel data.

Data which are converted into analog values are supplied to the sampling hold circuit of the WF or BC board via the buffer IC13-B.

3.5.4 Data distributor circuit

The data distributor circuit distributes data supplied from the transmitter.

This circuit is composed of the address counter, address decoder and data hold circuits installed in relating boards.

1. Address counter (KSB board)

   IC19 is a binary counter whose output is used for 7-bit address signal. Outputs Q0 (LSB) – Q2 are channel addresses and Q3 – Q6 (MSB) are parameter addresses.

   Each address signal is counted up every STC Ⓖ generation, and is reset when transmission of all parameter data finishes. AND outputs of parameter addresses Q4 and Q6 are utilized as the reset signal.

   Channel address signals are distributed not only to data hold circuits of relating boards but also to the transmitter via the line driver IC12. In the transmitter, this signal is used as switching signal for the multiplexer of the data selector.

   Parameter address signals are sent not only to the address decoder but also to the address decoder inside the transmitter via the line driver IC13.

   Timing chart

   Ⓖ – (20) : Countup starts at rise of this signal.

2. Address decover (KSG board)

   IC18 functions as the address decoder, which converts input parameter address signals into data latch trigger pulses Q0 to Q9. Only one of Q0 – Q9 pulses is s put out as "L" data in combination with parameter address signal. This output is synchronized with the rise of DATA WRITE Ⓗ signal.

   Data latch trigger pulses are supplied to the data hold circuits of the relating board. These data hold circuits rewrite the current data by reception of the data latch trigger pulse.

   Timing chart

   Ⓗ – (15) : Data latch trigger pulse is put out at rise of this signal.

3. Data hold circuits

   Data hold circuits rewrite stored data according to data newly received, and hold the new ones. Data hold circuits which are provided in every relating board are classified into the following by the function.

- Latch circuit : Holds 1-bit data.
- D/A converter: Convers FADE-TO-BLACK data consisting of eight 1-bit data into analog value, and holds the converted data.
- Sample and hold (S/H) circuit: Holds data which are reconverted into analog values by the D/A converter (Sec. 3.5.3).

The latch circuit is composed of a data latch circuit TC4099 and a buffer circuit, and provided on every board. Data to latch is selected with the channel address signal, and rewritten into new data in good time of the data latch trigger pulse (3.5.4-(2)).

The D/A converter (VIDEO board) is composed of TC4099 data latch circuit (IC8) , 74HC373 data latch circuit (IC9), buffer circuit (IC10), R-2R ladder resistor (RA-1) and buffer (IC12-A). FADE-TO-BLACK data is 8-bit data and it is supplied one bit by another in series, therefore, there are old data latched in the 2nd step until the whole of 8-bit data are latched in the 1st step. Output of the 2nd data latch circuit is supplied to R-2R ladder resistor to be converted into analog data.

In the sampling hold circuits (WF board, BC board), VC-1042 operates sampling hold. Analog data to hold are selected with channel address signal, and rewritten into new data being well-timed with data latch trigger pulse. In the sample hold circuit of the WF board, written data are moreover processed by sampling hold being well-timed with VD pulse.

Timing chart

Ⓗ – (15) : At rise of this signal one of data latch trigger pulses (Q0 – Q9) is generated, and data are rewritten.

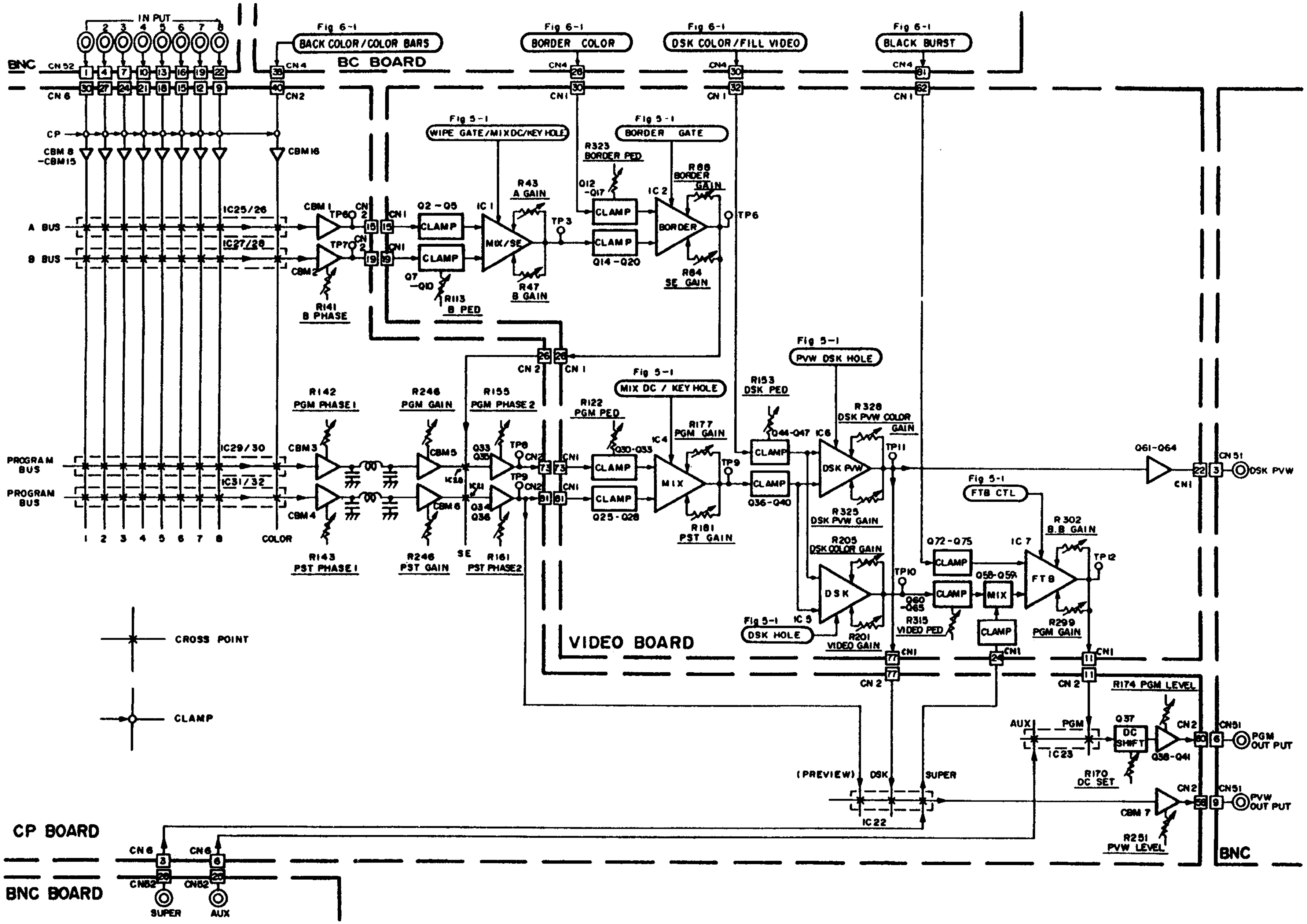

IN PUT
1 2 3 4 5 6 7 8
BNC
CN52
CN 6
CP
CBM 8 -CBM15
CBM16
A BUS
B BUS
PROGRAM BUS
PROGRAM BUS
IC25/26
IC27/28
IC29/30
IC31/32
COLOR
Fig 6-1
BACK COLOR/COLOR BARS
BC BOARD
CN4
CN2
CN1
BORDER COLOR
DSK COLOR/FILL VIDEO
BLACK BURST
Fig 5-1
WIPE GATE/MIXDC/KEY HOLE
BORDER GATE
CBM1
CBM2
TP6
TP7
R141 B PHASE
Q2-Q5
CLAMP
Q7 -Q10
R113 B PED
IC 1
MIX/SE
R43 A GAIN
R47 B GAIN
TP3
R323 BORDER PED
Q12 -Q17
Q14-Q20
IC 2
BORDER
R88 BORDER GAIN
R84 SE GAIN
TP6
R142 PGM PHASE I
R143 PST PHASE I
CBM3
CBM4
R246 PGM GAIN
R246 PST GAIN
CBM5
CBM6
IC58
IC41
R155 PGM PHASE 2
R161 PST PHASE2
SE
Q33 Q35
Q34 Q36
TP8
TP9
CN 2
CN I
R122 PGM PED
Q30-Q33
Q25-Q28
Fig 5-1
MIX DC / KEY HOLE
IC4
MIX
R177 PGM GAIN
R181 PST GAIN
TP9
R153 DSK PED
Q44-Q47
Q36-Q40
PVW DSK HOLE
IC6
DSK PVW
R328 DSK PVW COLOR GAIN
R325 DSK PVW GAIN
TP11
R205 DSK COLOR GAIN
IC 5
DSK
R201 VIDEO GAIN
DSK HOLE
TP10
Q60 -Q65
R315 VIDEO PED
Q72-Q75
Q58-Q59
IC 7
FTB
FTB CTL
R 302 B.B GAIN
R299 PGM GAIN
TP12
VIDEO BOARD
Q61-Q64
CN51
DSK PVW
R174 PGM LEVEL
AUX
PGM
IC23
Q37
DC SHIFT
Q38-Q41
R170 DC SET
PGM OUT PUT
(PREVIEW)
DSK
SUPER
IC22
CBM 7
R251 PVW LEVEL
PVW OUT PUT
BNC
CROSS POINT
CLAMP
CP BOARD
BNC BOARD
CN6
CN62
SUPER
AUX

Fig. 4-1 Video processing block diagram

4. VIDEO EFFECT PROCESSING

The following explains video effect processing in the main unit in the order of signal flow. See Fig. 4-1.

4.1 CROSSPOINT (CP board)

The CROSSPOINT transmits video signal selected by the BUS LINE SELECT buttons on the control panel.

4.1.1 INPUTS 1–8

Input signals 1–8 supplied to the rear panel enter independent CROSSPOINT CBMs (CBM8–15) respectively. Each CROSSPOINT CBM clamps the input signal to 0 V at the right time of CP signal and branches the signal into four lines to send it to the crosspoint of every bus.

4.1.2 COLOR signal

Color signals produced by the BC board and supplied to the CP board enter the crosspoint of every bus via the CROSSPOINT CBM (CBM16) in the same manner as the abovementioned input signals 1–8.

4.1.3 SE signal

SE signal which is generated and processed by the VIDEO board is supplied to IC20 and IC21 of the CP board.

IC20 and IC21 turns on/off SE signal output to the PROGRAM bus and PRESET bus respectively. When SE is selected for the respective buses, SE signal is supplied to the switched bus, otherwise (input signals 1–8 or COLOR signal selected) the crosspoint output of respective buses are put out.

4.1.4 Crosspoint of each bus

The crosspoint of each bus is composed of multiplexers. IC25 to IC32 are multiplexers and they select one of the INPUT signals 1 to 8 and COLOR signal.

Selection signals (A, B, C, INH) of each bus are produced by the binary code converter circuit of the SB board. IC14 and IC18 of the CP board function as the latch circuit and output circuit of the selection signals.

Crosspoint output signal of each bus is supplied to the next circuit respectively.

1. A-bus/B-bus crosspoint output signal

   Both of A-bus and B-bus crosspoint output signals are supplied to the VIDEO board via the BUFFER CBMs as A-bus output and B-bus output for EFFECT processing.
2. PROGRAM-bus/PRESET-bus crosspoint output signal

   These crosspoint output signals are supplied to the VIDEO AMP CBMs (CBM5, 6) via the delay circuit composed of L11–16 and C75–83 or L18–23 and C87–92. The delay circuits correct phase difference between these crosspoint output signals and the SE signal processed by the VIDEO board.

   Signals output from the VIDEO AMP CBMs are supplied to IC20 and IC21 respectively. IC20 and IC21 switch between these signals and the SE signal (see Sec. 4.1.3). Output of IC20 is sent to the phase shifter composed of Q33 and Q35 for fine-adjustment of its color phase and then supplied to the VIDEO board as PROGRAM bus output for EFFECT processing.

   Output of IC21 branches into two lines after fine-adjustment of the color phase by the phase shifter composed of Q34 and Q36. One is supplied to the VIDEO board as PRESET bus output for EFFECT processing, and the other is supplied to IC22.

   IC22 is an analog switch to which DSK PVW (DSK preview) and SUPER signals are supplied besides the PRESET bus signal. These input signals are selected by the PREVIEW SELECT button on the control panel. Selected signal, after its gain is adjusted by CBM7, is put out from the PVW OUTPUT on the rear panel as PREVIEW output.

4.2 EFFECT AMP (VIDEO board)

The EFFECT amp processes various effects on video input signals selected by the crosspoint. The circuit configuration of the EFFECT amp is shown in Fig. 4-2.

For control signals which control respective EFFECT amps, refer to Section 5.

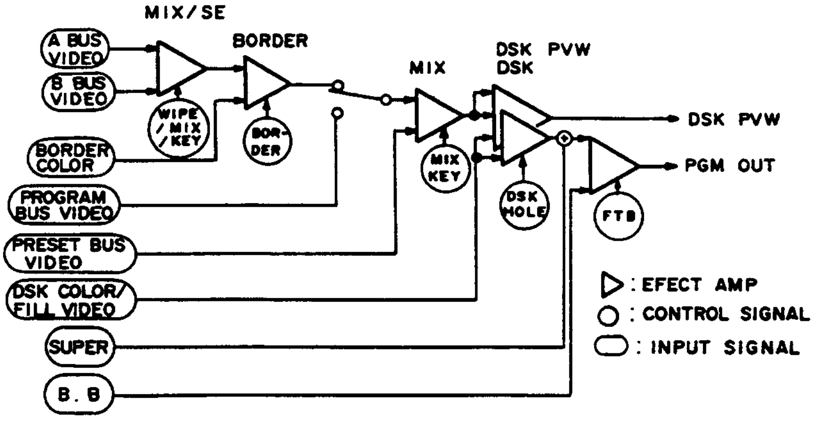


Fig. 4-2 Effects amp block diagram

4.2.1 MIX/SE amp.

This amp. controls the effect selected and controlled by the MIX/SE lever on the control panel. In detail, WIPE or MIX effect of the image selected by A-bus and B-bus as well as switchover of KEYING are carried out by this amp.

A-bus and B-bus signals supplied from the CP board enter the IC1 MIX/SE amp. after they are clamped at the right time of CP (clamp pulse).

CP is oscillated timing with the back porch of input VBS, namely, at the right time of the BURST signal, and it clamps the BURST level to about −2 V.

L1/C6 (A-bus) and L2/C22 are parallel resonance tank circuits respectively (NTSC : 3.58 MHz, PAL : 4.43 MHz) which increase the signal in the impedance, therefore, the clamping is performed without disturbance of burst of the input VBS. Both potentials of A-bus and B-bus inputs are equalized before they are supplied to the MIX/SE amp (IC1).

Fig. 4-3 is a circuit diagram of the MIX/SE amp. The circuit inside the box of leaders is the equivalent circuit of IC1’s main section.

X1 and X2 as well as X3 and X4 form a pair of balanced differential amps. Collectors of X2 and X3 as well as those of X1 and X4 are respectively connected with common loads Q11 and Q12 to form a double balanced differential amps.

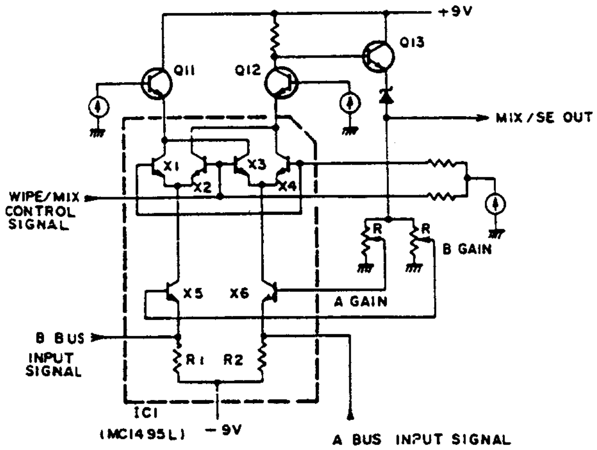


Fig. 4-3 MIX/SE amp

X5 and X6 are constant current sources, but their current values vary according to input signals to A-bus and B-bus. Bases of X2 and X3 are supplied with the following control voltages.

WIPE mode : WIPE gate pulse
MIX mode : MIX DC voltage

Collector currents of X2 and X3 flow in proportion to the supplied control voltage, while collector currents which flow into X1 and X4 of a pair of balanced differential amp are in inverse proportion. Therefore, the sum of the collector currents flowing into X1 and X2 as well as X3 and X4 are proportional to the input signals of A-bus and B-bus.

The WIPE/MIX control voltage varies by about ±200 mV, therefore, it changes X2 and X3 from the saturated state to being cut off.

When X2 and X3 are saturated, B-bus signal is cut off while A-bus signal is supplied to the collector of Q12.

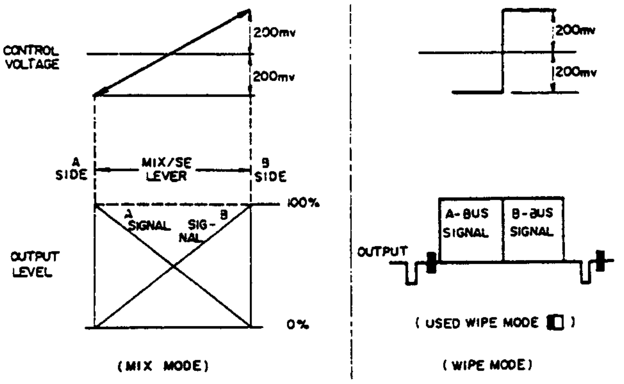


Fig. 4-4 Control signal of MIX and WIPE mode

When the KEYING is switched on/off by the MIX/SE lever, KEY HOLE is added to WIPE GATE pulse or MIX DC voltage in AND operation.

Output of the MIX/SE amp is supplied to the BORDER amp.

4.2.2 BORDER amp.

In WIPE effect mode, the BORDER amp colors borders of the image.

IC2 is the BORDER amp whose principle is the same as that of the MIX/SE amp. Control signals are BORDER GATE signals produced by the WF board. This amp. cuts out output of the MIX/SE amp at the right time of the BORDER GATE signal and inserts the BORDER COLOR signal generated by the BC board into the picture. The output of the BORDER amp is supplied to the CP board as SE signal.

When the BORDER switch on the control panel is turned off or the WIPE effect is not selected, the BORDER amp transmits output of the MIX/SE amp to the CP board as SE board as it is.

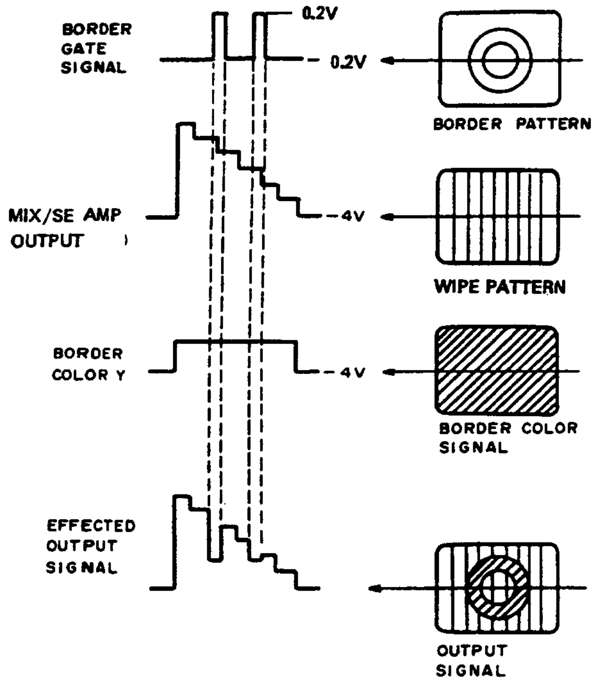


Fig. 4-5 BORDER effect

4.2.3 MIX amp.

The MIX amp. processes video effects operated by the MIX/SE lever.

MIX effect selected by the PROGRAM bus and PRESET bus and on/off switchover of KEYING are managed by this amp.

IC3 is the MIX amp whose principle is the same as that of the MIX/SE amp. Control signals are MIX DC voltages (that are different from MIX DC of the MIX/SE amp).

When the KEYING is turned on/off by the MIX lever, KEY HOLE is added to the MIX DC voltage in AND operation.

Output of the MIX amp is supplied to the DSK amp and DSK PVW amp.

4.2.4 DSK amp. and DSK PVW amp.

The DSK effect is produced by these amps whose principle is the same as that of the MIX/SE amp. Output of the amp is extracted with the DSK HOLE generated by the BC board and DSK file image supplied from the BC board is inserted into the picture.

There are two systems of PGM and PVW in the DSK amp. circuit. Output of the PGM is supplied to the FTB (Fade-out) amp, while output of the PVW is branched into two routes. One ie flows through the output amp composed of Q61 to Q64 and goes out from the DSK PVW terminal on the rear panel, and the other is supplied to IC22 of the CP board. IC22 is an analog switch to select PVW output signal.

4.2.5 FTB (Fade-to-Black - Fade-out) amp.

This amp performs fade-out and exchanges for SYNC and BURST signals. The principle of this amp is the same as that of the MIX/SE amp.

Control signals of this amp are FTB signals (will be mentioned later).

Output of the DSK amp is mixed with SUPER signal supplied from the rear panel by Q58/Q59 before it enters the FTB amp.

Input signals to the FTB amp are output of the DSK amp and B-B signal produced by the BC board. FTB control signal substitute the blanking period of the DSK amp with B-B signal. During input of video signal DC voltage of the FTB control signal is mixed to the B-B signal by AND operation. By varying this DC voltage, therefore, fade-in and fade-out is carried out.

Output of the FTB amp is supplied from the VIDEO board to the output amp composed of Q38–Q41 after its DC level is adjusted by Q37 of the CP board. After the gain of the signal is adjusted by the output amp., it is put out from the PGM OUT terminal as the PROGRAM output.

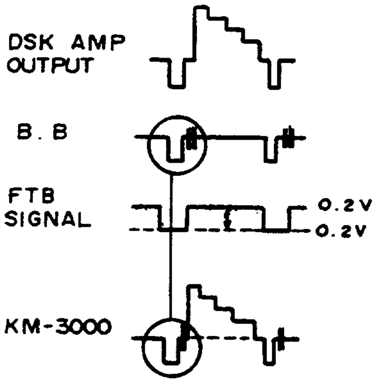


Fig. 4-6

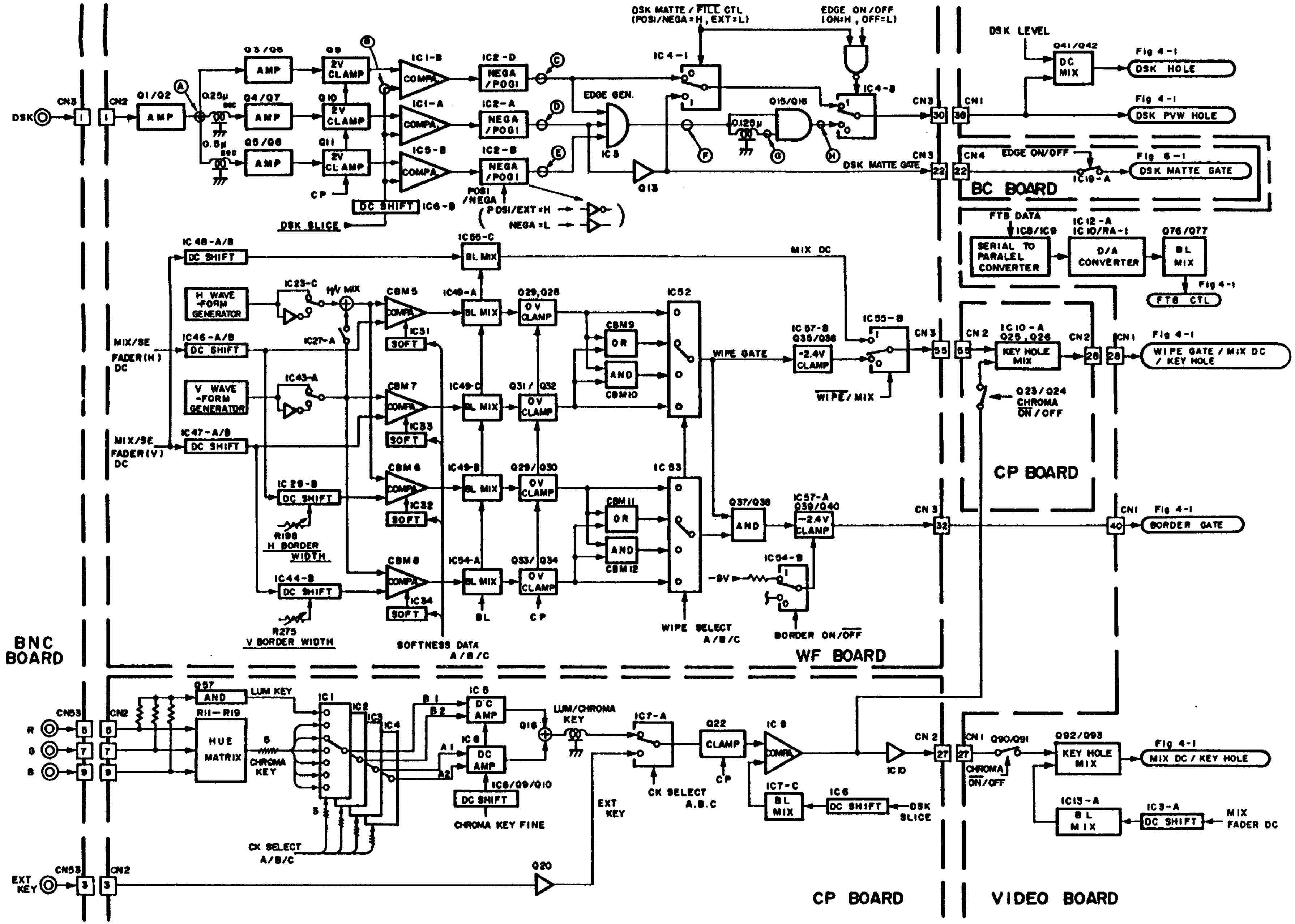

DSK
CN3
CN2
Q1/Q2
AMP
Q3/Q6
Q4/Q7
Q5/Q8
0.25μ sec
0.5μ sec
Q9
Q10
Q11
2V CLAMP
CP
IC1-B
IC1-A
IC5-B
COMPA
IC2-D
IC2-A
IC2-B
NEGA /POGI
DC SHIFT
IC6-B
DSK SLICE
POSI /NEGA
POSI/EXT=H
NEGA=L
EDGE GEN.
IC3
Q13
IC4-1
DSK MATTE / FILL CTL (POSI/NEGA=H, EXT=L)
EDGE ON/OFF (ON=H, OFF=L)
IC4-B
Q15/Q16
0.120μ
DSK MATTE GATE
CN3
CN1
CN4
DSK LEVEL
Q41/Q42
DC MIX
Fig 4-1
DSK HOLE
DSK PVW HOLE
EDGE ON/OFF
IC19-A
Fig 6-1
DSK MATTE GATE
BC BOARD
FTB DATA
IC8/IC9
SERIAL TO PARALEL CONVERTER
IC12-A
IC10/RA-1
D/A CONVERTER
Q76/Q77
BL MIX
FTB CTL
IC48-A/B
IC55-C
BL MIX
MIX DC
H WAVE -FORM GENERATOR
V WAVE -FORM GENERATOR
IC23-C
IC27-A
IC43-A
H/V MIX
MIX/SE FADER(H) DC
MIX/SE FADER(V) DC
IC46-A/B
IC47-A/B
CBM5
CBM7
CBM6
CBM8
IC31
IC33
IC32
IC34
SOFT
IC29-B
IC44-B
R198
H BORDER WIDTH
R275
V BORDER WIDTH
SOFTNESS DATA A/B/C
IC49-A
IC49-C
IC49-B
IC54-A
Q29,Q28
Q31/Q32
Q29/Q30
Q33/Q34
0V CLAMP
BL
CP
CBM9
OR
AND
CBM10
CBM11
CBM12
IC52
IC53
WIPE SELECT A/B/C
WIPE GATE
IC57-B
Q35/Q36
-2.4V CLAMP
IC55-B
WIPE/MIX
Q37/Q38
IC57-A
Q39/Q40
-2.4V CLAMP
IC54-B
-9V
BORDER ON/OFF
WF BOARD
CN3
CN2
IC10-A
Q25,Q26
KEY HOLE MIX
Q23/Q24
CHROMA ON/OFF
CP BOARD
CN2
CN1
WIPE GATE / MIX DC / KEY HOLE
BORDER GATE
BNC BOARD
CN53
R
G
B
Q57
AND
LUM KEY
R11—R19
HUE MATRIX
CHROMA KEY
IC1
IC2
IC3
IC4
CK SELECT A/B/C
B1
B2
A1
A2
IC5
IC6
DC AMP
IC6/Q9/Q10
DC SHIFT
CHROMA KEY FINE
Q16
LUM/CHROMA KEY
IC7-A
CK SELECT A.B.C
EXT KEY
Q20
Q22
CLAMP
IC9
IC7-C
BL MIX
IC6
DC SHIFT
DSK SLICE
IC10
CN2
CN1
Q90/Q91
CHROMA ON/OFF
Q92/Q93
KEY HOLE MIX
MIX DC / KEY HOLE
IC13-A
BL MIX
IC3-A
DC SHIFT
MIX FADER DC
CP BOARD
VIDEO BOARD
EXT KEY

Fig. 5-1 Control signals block diagram

5. GENERATION OF CONTROL SIGNALS

The following describes various kinds of control signals to control image processing by the EFFECT amps.

Fig. 5-1 shows a block diagram of the signal generation circuit.

5.1 GENERATION OF WIPE GATE (WF) SIGNAL

This signal controls WIPE effect produced by the MIX/SE amp. The signal generator circuit is composed of the WIPE waveform generator circuit and the waveform processing circuit.

5.1.1 WIPE waveform generator circuit

WIPE waveform is formed by sawtooth waveform, triangular waveform and parabolic waveform, and these waveforms are respectively produced by H rate and by V rate. Fig. 5-2 is a block diagram of the circuit.

1. Sawtooth/Triangular waveforms generator circuits
   Sawtooth waveform of H period is yielded by integration of fixed voltage generated by the DC level shifter (IC17-B, IC18-A/B) for the CP (clamp pulse) period. IC21-B and Q21 form the integrating circuit. When the positioner is turned off, time constant of the sawtooth waveform is set at a level of 2.5 V as 0 V is the origin.
   In case of triangular waveform, the time constant is set half, in other words, the gradient of the waveform is twice as slant as the sawtooth waveform. Time constant is changed by switching an analog switch IC19-A with the CONT. A pulse. IC22-A (comparator) starts the flip-flop circuit (IC20-A) to raise the pulse when the peak of the sawtooth waveform reaches 2.5 V. At the same time, IC19-C is switched and the charge voltage of the integrating circuit is inverted based on 0 V. As a result, the waveform starts discharge at the same time constant as in charge time and resultant triangular waveform is produced.
   In case of V period, the waveforms are produced in the same manner as in H period except the use of VD pulse which is integrated for CP pulse.

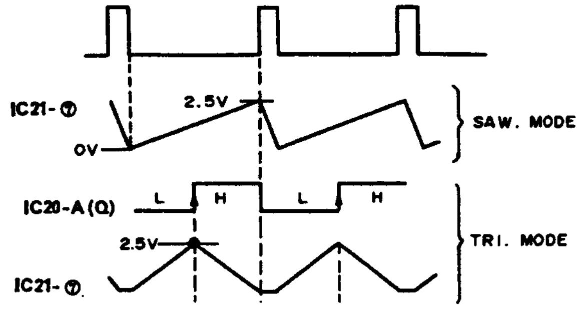


Fig. 5-3

2. Parabolic waveform generator circuit
   Parabolic waveform is obtained by the VCA which processes input triangular waveform. IC30 and IC42 are VCAs for parabolic waveform generation, the former is for H period and the latter for V period.
   Sawtooth waveform is inverted to be negative polarity before it is supplied to the VCA. By supplying the sawtooth waveform of the negative polarity together with VCA's inversion input to the input control signal, the output becomes parabolic waveform.

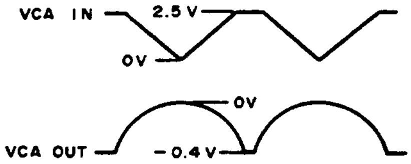


Fig. 5-4

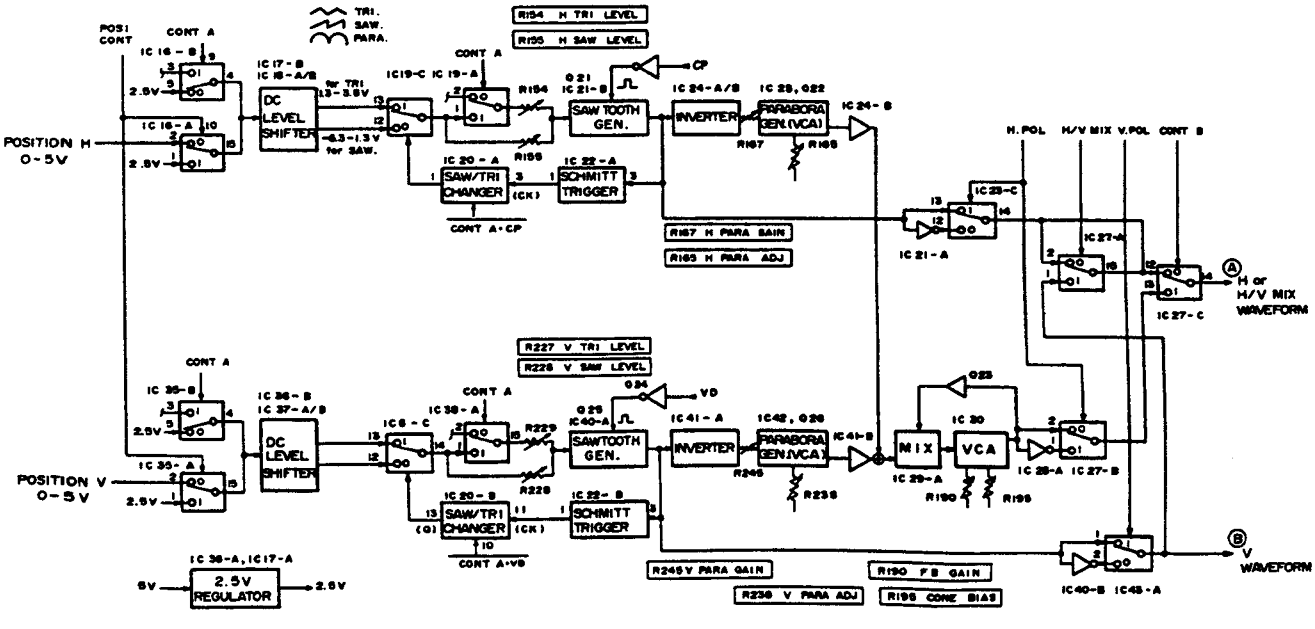

POSI CONT
CONT A
IC 16-B
2.5V
IC 16-A
POSITION H
0-5V
TRI.
SAW.
PARA.
IC 17-B
IC 18-A/B
DC LEVEL SHIFTER
for TRI 1.3-3.8V
-6.3-1.3V for SAW.
IC19-C IC 19-A
CONT A
R154 H TRI LEVEL
R155 H SAW LEVEL
R154
R155
Q21
IC 21-B
CP
SAW TOOTH GEN.
IC 20-A
SAW/TRI CHANGER
(CK)
CONT A·CP
IC 22-A
SCHMITT TRIGGER
IC 24-A/B
INVERTER
IC 28, Q22
PARABORA GEN.(VCA)
R167
R165
IC 24-B
R167 H PARA GAIN
R165 H PARA ADJ
H.POL
H/V MIX
V.POL
CONT B
IC 23-C
IC 21-A
IC 27-A
IC 27-C
Ⓐ
H or H/V MIX WAVEFORM
CONT A
IC 35-B
2.5V
IC 35-A
POSITION V
0-5V
IC 36-B
IC 37-A/B
DC LEVEL SHIFTER
IC 8-C
IC 38-A
CONT A
R227 V TRI LEVEL
R228 V SAW LEVEL
R229
R228
Q34
VD
Q26
IC40-A
SAWTOOTH GEN.
IC 20-B
SAW/TRI CHANGER
(Q)
(CK)
CONT A·VD
IC 22-B
SCHMITT TRIGGER
IC 41-A
INVERTER
IC42, Q26
PARABORA GEN.(VCA)
R246
R238
IC41-B
MIX
IC 29-A
Q23
IC 30
VCA
R190
R198
IC 28-A
IC 27-B
R246 V PARA GAIN
R238 V PARA ADJ
R190 FB GAIN
R198 CONE BIAS
IC40-B
IC43-A
Ⓑ
V WAVEFORM
IC 36-A, IC17-A
5V
2.5V REGULATOR
2.5V

Fig. 5-2 WIPE waveform generator block diagram

Respective H and V period parabolic waveforms are mixed with input of IC29-A and supplied to the VCA for CIRCLE WIPE waveform.

IC30 is the VCA to produce the CIRCLE WIPE waveform. This VCA is used as a square-low circuit, but it also functions as a square-root circuit when this is inserted in the negative feedback loop of the buffer IC29-A.

In comparison with the conventional CIRCLE WIPE signal of KM-2000, etc., this CIRCLE WIPE effect has such a merit that the pattern is hardly blurred in the edge even in a small WIPE pattern.

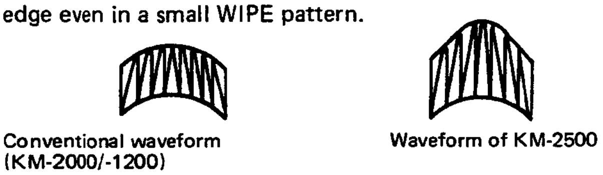


Fig. 5-5 ROUND WIPE signal (H/V MIX waveform, V-rate)

3. Positioner circuit

   This circuit shifts the phase of the triangular waveforms by the positioner voltage supplied by the control unit.

   Phase shifting is performed by varying the reference voltage of the integration circuit by the positioner voltage.

   The phase of the triangular waveform changes since the peak value is set at 2.5 V.

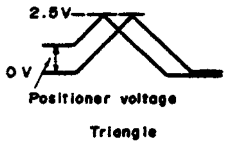


Fig. 5-6

4. Waveform selection circuit

   Waveforms which pass the above steps 1 through 3 are selected by the WAVEFORM SELECTION signal to be formed adequately to the selected WIPE patterns.

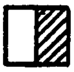
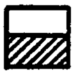
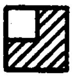
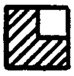
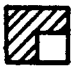
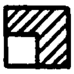
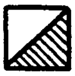
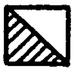
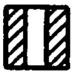
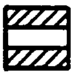
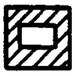
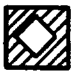
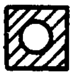
   Waveform selection signals are yielded by passing decode outputs of wipe codes assigned to respective wipe patterns through the diode matrix.

   Table 5-1 shows waveform selection signals corresponding to wipe patterns.

   The waveform selection circuit is composed of analog switches.

   Analog switch IC27-C switches between CIRCLE WIPE signal and signals of other patterns. IC23-C, IC43-A and IC27-B are switches for between the normal waveform and reverse waveform. For reverse waveform, they select the waveform inverted by the inverter. IC27-A functions to switch between the waveform of H only and the H/V-mixed waveform.

Table 5-1

PATTERN	WIPE CODE				WF SELECT			POS ON/OFF	CONT A	CONT B	H POL	V POL	H/V MIX
	INH	C	B	A	C	B	A						
MIX	1	1	1	1	0	0	0	0	0	0	0	0	0
	1	1	1	0	1	1	0	0	0	0	0/1	0/1	0
	1	1	0	1	1	1	1	0	0	0	0/1	0/1	0
	1	1	0	0	1	0	1/0	0	0	0	0/1	0/1	0
	1	0	1	1	1	0	1/0	0	0	0	1/0	0/1	0
	1	0	1	0	1	0	1/0	0	0	0	1/0	1/0	0
	1	0	0	1	1	0	1/0	0	0	0	0/1	1/0	0
	0	1	1	1	0	1	1	0	0	0	0/1	0/1	1
	0	1	1	0	0	1	1	0	0	0	1/0	0/1	1
	0	1	0	1	1	1	0	0	0	0	1/0	0/1	0
	0	1	0	0	1	1	1	0	1	0	0/1	1/0	0
	0	0	1	1	1	0	1/0	1(0)	1	0	1/0	1/0	0
	0	0	1	0	0	1	1	1(0)	1	0	1/0	1/0	1
	0	0	0	1	0	0	0	1(0)	1	1	0/1	0/1	1

1 : High
0 : Low
1/0
0/1] POLARITY : H / POLARITY : L
1(0) : Positioner ON : 1, OFF : 0

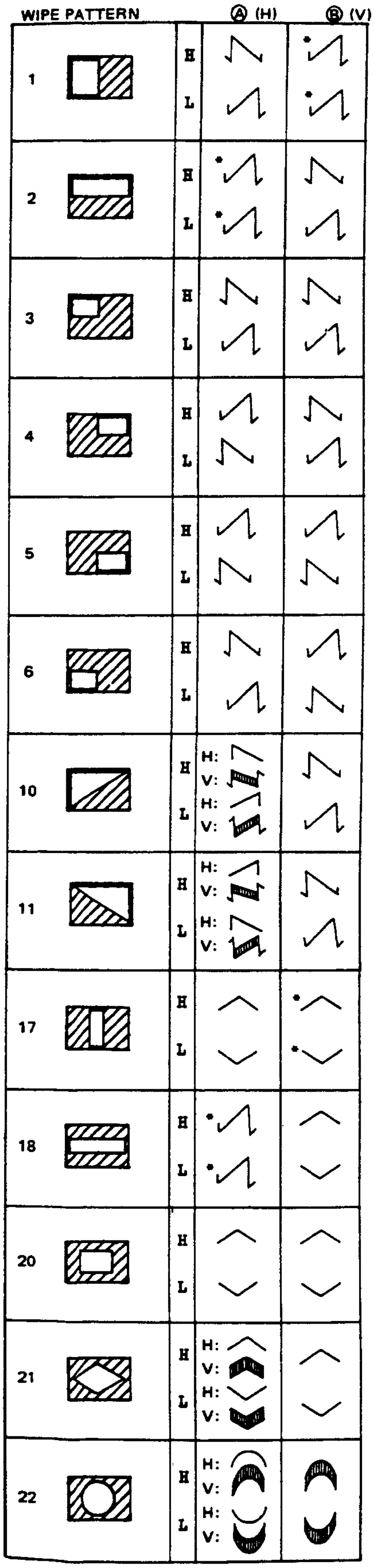
5. Output waveforms

   Table 5-2 shows output waveforms that appear at points Ⓐ and Ⓑ of the block diagram (Fig. 5-2) in respective wipe patterns.

   The POLARITY in Table 5-2 is a signal whose H/L potential is determined by the position of the MIX/SE lever as well as by the wipe mode (NORMAL/REVERSE), and this signal controls polarity of each wipe waveform. For generation of the POLARITY signal, refer to Sect. 2.3.3.

   Every output waveform is supplied to the comparator of the waveform processing circuit.

Table 5-2



•UNUSED

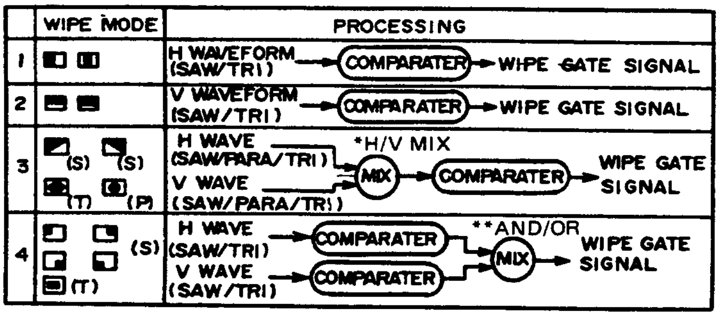
5.1.2 Waveform processing circuit (WF board)

This circuit processes WIPE waveforms produced by the waveform generating circuit in order to generate WIPE GATE signal and BORDER GATE signal. For a block diagram, see Fig. 5-1.

The circuit is roughly classified into the comparator circuit, AND/OR circuit and WIPE GATE signal output circuit.

As shown in Table 5-3, there are four ways to process sawtooth waveform, parabolic waveform and triangular waveform at both H and V rates to form WIPE waveforms.

Table 5-3



	WIPE MODE	PROCESSING
1	◧ ◫	H WAVEFORM (SAW/TRI) → COMPARATER → WIPE GATE SIGNAL
2	⬒ ⬓	V WAVEFORM (SAW/TRI) → COMPARATER → WIPE GATE SIGNAL
3	◩ (S) ◪ (S) ▣ (T) ◙ (P)	H WAVE (SAW/PARA/TRI), V WAVE (SAW/PARA/TRI) → *H/V MIX (MIX) → COMPARATER → WIPE GATE SIGNAL
4	◰ ◳ ◱ ◲ (S) ▤ (T)	H WAVE (SAW/TRI) → COMPARATER, V WAVE (SAW/TRI) → COMPARATER → **AND/OR (MIX) → WIPE GATE SIGNAL

S : SAWTOOTH
T : TRIANGLE
P : PARABOLA

* H-V mixed waveform is generated by the wipe waveform generation circuit.

** WIPE GATE signal passes AND circuit when POLARITY signal is H, while it passes OR circuit when POLARITY is L.

BORDER GATE signal passes AND circuit when POLARITY signal is L, while it passes OR circuit when the signal is H.

1. Comparator circuit

   CBM5–8 are the comparator circuits, which are independent by purpose such as for WIPE EFFECT and for BORDER in addition to classification of H and V rates.

   Each comparator generates WIPE GAGE signal comparing the wipe waveform input to CBM pin ⑧ with the fader voltage input to CBM pin ⑨. Fader voltage is determined by the position of the FADER lever. When the WIPE waveform is higher than the fader voltage, the WIPE GATE signal becomes "H", while if it is lower than the voltage, the WIPE GATE signal becomes "L".

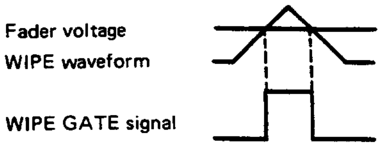


Fig. 5-7

BORDER GATE signal is output from the comparator as well as WIPE GATE signal, but the polarity is reverse. When BORDER GATE is ON, fader voltage supplied to the comparator for BORDER processing is higher. As a result, width of BORDER GATE signal becomes narrower than that for WIPE EFFECT. The BORDER GATE signal obtained in the above manner is mixed with the wipe gate circuit which will be mentioned in 5.-b).
Level of fader voltage is shifted by IC29-B and IC44-B.

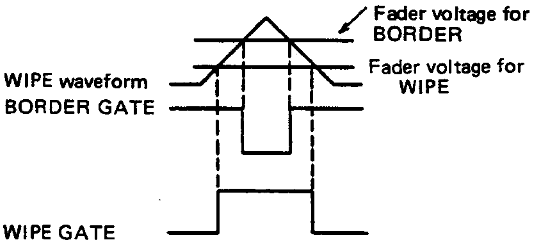

Fader voltage for BORDER
Fader voltage for WIPE
WIPE waveform
BORDER GATE
WIPE GATE

Fig. 5-8

2. Softness circuit
   This circuit is provided for blurring edges in wiping. Edges can be blurred by making the rise and fall of the WIPE GATE signal gentle.
   By varying the resistance value connected to pins⑥and ⑦of the comparator CBM, the rise and fall at the edge become steep.
   The analog switches (IC31—IC34) connected to pins⑥ and ⑦ switch the resistance by the SOFTNESS data A/B/C supplied from the control unit.

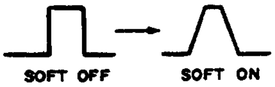

SOFT OFF
SOFT ON

Fig. 5-9 WIPE GATE signal in SOFTNESS mode

WIPE GATE signal whose border and softness are processed by the comparator is supplied to analog switches (IC49-A/B/C, IC54-A) for blanking mix, then clamped to 0 V by Q27—Q34 to be further supplied to the AND/OR circuit or the wipe gate selector circuit.

3. AND/OR circuit
   This circuit mixes the WIPE GATE signals for the selected wipe pattern shown in Table 5-3(4).

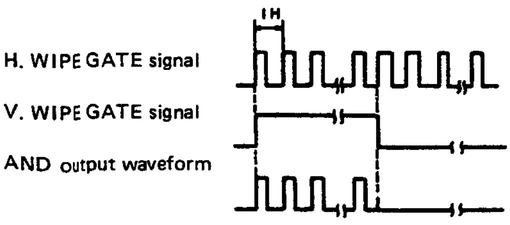

1H
H. WIPE GATE signal
V. WIPE GATE signal
AND output waveform

Fig. 5-10

By way of example, Fig. 5-10 shows the WIPE GATE signal in the normal mode pattern observed at V rate.
If a picture (B) of the B-BUS is output in the period of H level, the image in the AND output is as shown in the following.

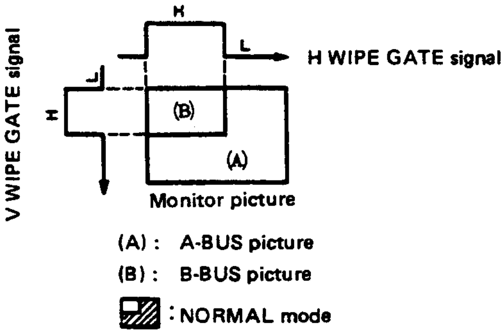

V WIPE GATE signal
H
L
H
L
H WIPE GATE signal
(B)
(A)
Monitor picture
(A) : A-BUS picture
(B) : B-BUS picture
▨ : NORMAL mode

Fig. 5-11

In the reverse mode, output picture becomes as shown in Fig. 5-12 since WIPE GATE signals pass the OR circuit.

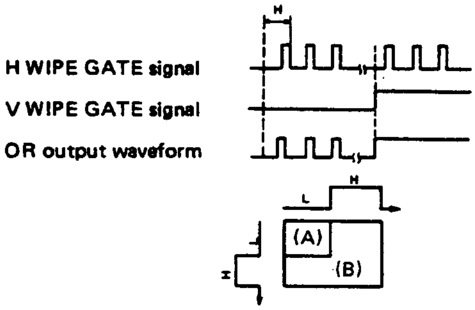

H
H WIPE GATE signal
V WIPE GATE signal
OR output waveform
L
H
L
H
(A)
(B)

Fig. 5-12

Output of the AND/OR circuit is supplied to the WIPE GATE signal selector circuit.

4. WIPE GATE selector circuit
   This circuit selects WIPE GATE signal to be used for the selected wipe pattern with WF SELECT A/B/C signals mentioned in the previous section 5.1.1 - 4.
   IC52 and IC53 form the multiplexer for signal selection. According to the selected wipe pattern, it selects WIPE GATE signal in the four manners shown in Table 5-3.
5. Output circuit
   Signals which passed the WIPE GATE signal selector circuit are supplied to every board as indicated in the following items a) and b).

a) WIPE GATE/MIX DC signals
   WIPE GATE signal is supplied via the analog switch IC55-B to the CP board. If MIX is selected for the effect, IC55-B is switched to output MIX DC signal to the CP board. The MIX DC signal is what MIX/SE fader voltage (V) supplied from the control unit is shifted by IC48-A/B and then its blanking is processed.

WIPE GATE/MIX DC signals are mixed with KEY HOLE signal in the CP board and then supplied to the VIDEO board, which utilizes this signal as control signal of the MIX/SE amp.

b) BORDER GATE signal

This signal is supplied together with inverted WIPE GATE signal to the AND circuit Q37/Q38, and then output from it. This signal is sent to the BORDER amp of the VIDEO board to be used for A-BUS and B-BUS EFFECTS.

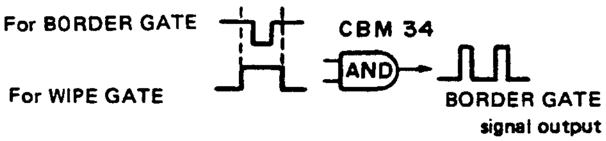

For BORDER GATE
CBM 34
For WIPE GATE
AND
BORDER GATE
signal output

Fig. 5-13

When BORDER is OFF, analog switch IC54-B is switched to –9 V siee to shift the BORDER GATE signal and not to output it.

5.2 GENERATION OF KEY HOLE (CP board)

KEY HOLE is the control signal for KEYING operated by the MIX/SE lever.

In the KM-2500, available KEYINGs by MIX/SE lever are as follows.

1) Chroma key
2) Luminance key
3) EXT key

For block diagram, see Fig. 5-1 (on page 26).

5.2.1 Generation of chroma key hole/luminance key hole

Chroma key hole signal and luminance key hole signal are generated by utilizing of R, G, B signals coming through the rear panel.

1. HUE MATRIX circuit

The HUE dial consists of a resistor network comprising R11 to R19, switching ICs (IC1 to IC4) and a DC control amplifier (IC5, IC8). This circuit is used to make a hue signal and complementary color signal which make a KEY signal from the R, G, B signals.

Six hues (G Cy, B Cy, B Mg, R Mg, R Yl and G Yl) are made from the R, G and B signals by the following resistor network. These signals are combined to make six hue positions (G, Cy, B, Mg, R and Yl).

Table 5-4 shows the hues of the output signals of each switching IC (IC1 to IC4) when each hue is selected by the chroma key "COARSE".

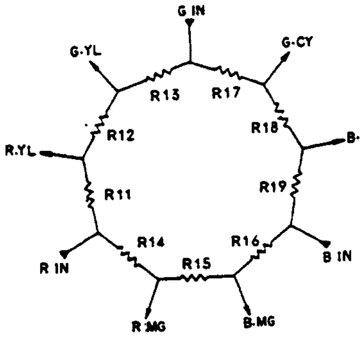

G IN
G-YL
G-CY
R13
R17
R12
R18
R.YL
B-CY
R11
R19
R14
R16
R IN
R15
B IN
R MG
B-MG

Fig. 5-14 Resistor network

Table 5-4

HUE KNOB COARSE		A 1	A 2	B 1	B 2
1	G	G.YL	G.CY	B.MG	R.MG
2	C Y	G.CY	B.CY	R.MG	R.YL
3	B	B.CY	B.MG	R.YL	G.YL
4	M G	B.MG	R.MG	G.YL	G.CY
5	R	R.MG	R.YL	G.CY	B.CY
6	Y L	R.YL	G.YL	B.CY	B.MG

Hues 1 through 6 are composed and made as follows.

Selected hue = (A1 + A2) – (B1 + B2)

The base of Q9 and Q10 are controlled, and the signal levels of A1, A2 and B1, B2 of the DC control ICs IC5 and IC8 are varied by the chroma key "FINE" control, enabling variation of the hue selected by the COARSE key.

Signal A (A1 + A2) is fed to the emitter of Q16.

Signal B (B1 + B2) is fed to the base of Q16.

As a result, difference signal of A and B is obtained at collector of Q16.

When the input signal is a color bar and the COARSE key is set to the BLUE position, the block diagram and waveforms are as shown below.

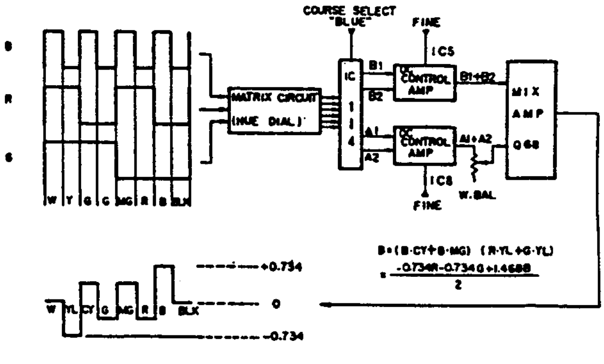

COURSE SELECT "BLUE"
FINE
IC5
B
R
G
MATRIX CIRCUIT
(HUE DIAL)
IC 1 1 4
B1
B2
A1
A2
DC CONTROL AMP
B1+B2
A1+A2
MIX AMP Q68
IC8
FINE
W.BAL
W Y G G MG R B BLK
B=(B·CY+B·MG) (R·YL+G·YL)
= -0.734R-0.734G+1.468B / 2
+0.734
0
-0.734
W YL CY G MG R B BLK

Fig. 5-15 COARSE setting "B" as example

When the input is a signal in which R, G and B are equal (i.e. white and black), the WHITE BALANCE (R50) should be adjusted so that even if any hue is selected by the COARSE key, A–B becomes zero in the output of signals A (A1 + A2) and B (B1 + B2).

The output of HUE matrix circuit is supplied to delay circuit.

2. Generation of luminance signal

   Luminance signal which is necessary to generate the luminance key hole is obtained by mixing R, G, B signals by resistors.

   Obtained luminance signal is supplied via the multiplexer of the hue matrix circuit to the DC control amp IC5, which controls gain of the luminance signal and supplies it to the delay circuit.

3. Delay circuit

   The delay circuit delays the key signal by adjusting its timing to the VBS signal, because there is chroma key delay between key camera signals R, G and B and the VBS signal (composite video signal).

   The delay time is about 0.65 μs for NTSC and about 0.35 μs for PAL. For fine adjustment, the delay amount can be varied by about ±0.2 μs by R105 (KEY DELAY). Output of the delay circuit is supplied to the comparator after it passes an analog switch IC7-A and is clamped by Q22.

   IC7-A switches between the key camera signal and external key signal.

4. Comparator

   IC9 is the comparator which compares the signal obtained from the hue matrix or the luminance signal with the SLICE level which can be varied by turning the KEY SLICE control. This output becomes the KEY HOLE signal.

   KEY HOLE signal is supplied in two routes. One is mixed with WIPE GAGE/MIX DC signal input to the CP board by Q25/Q26 and then supplied to the MIX/SE amp of the VIDEO board. The other is directly supplied to the VIDEO board and mixed with the MIX DC of the MIX lever to become the control signal of the MIX amp. To avoid simultaneous input of the KEY HOLE signal to the MIX/SE amp and MIX amp, Q23/Q24 of the CP board and Q90/Q91 of the VIDEO board perform on/off operation. Their on/off operations are controlled by the CHROMA ON/OFF signal generated according to the set position of the CHROMA KEY MODE switch on the control panel.

5.2.2 EXT. KEY HOLE

External KEY HOLE signal is originated from B/W signal input coming through the EXT KEY connector of the rear panel.

EXT KEY signal flowing from the rear panel to the CP board enters the analog switch IC7-A via the buffer Q20. IC7-A is switched when the CHROMA KEY COARSE switch on the control panel is set to "EXT" to supply the EXT KEY signal to the comparator. The input EXT KEY signal becomes the EXT KEY HOLE signal, and then it is supplied to the EFFECT amp. in the same manner as the CHROMA KEY HOLE signal.

5.3 GENERATION OF DSK HOLE SIGNAL (WF board)

DSK HOLE signal is the control signal of the DSK/DSK PVW amp. See the block diagram of Fig. 5-1 (on page 26). B/W video signal input to the WF board from the DSK connector of the rear panel is supplied to the buffer Q1/Q2, and then it is branched into three routes in which DSK HOLE signals having different phase with each other are generated. Moreover, those three DSK HOLE signals are mixed to produce new DSK HOLE signal. These DSK HOLE signals are properly used according to the DSK mode.

1. Generation of DSK HOLE signal

   Sectional waveforms Ⓐ to Ⓗ in Fig. 5-1 are shown in Fig. 5-16.

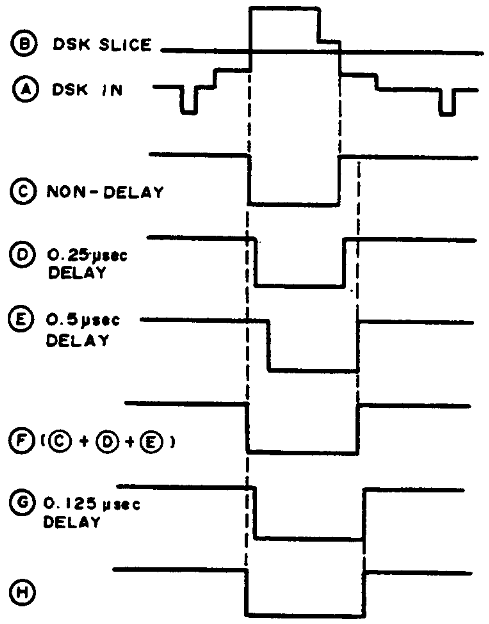


Fig. 5-16 DSK HOLE signal generation (POSI mode)

Ⓐ is the original signal which enters the DSK connector. Although this signal is branched into three lines, the following describes about the signal which does not flow through the delay line.

The original signal is input to the comparator IC1-B via the amp Q3/Q6 and clamp circuit Q9. The comparator compares the original signal with DSK SLICE level Ⓑ to generate DSK HOLE signal. DSK HOLE signal is inverted by IC2-D when the DSK mode is "POSI" or "EXT". (Ⓒ)

In other routes, the signal passes the delay line (0.25 μs or 0.5 μs respectively) and generates DSK HOLE signal in the same manner as mentioned above. (Ⓓ, Ⓔ)

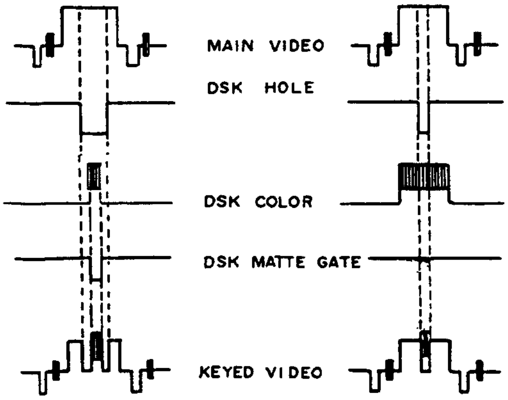
IC3 mixes those DSK HOLE signals having different phases, and sends the mixed signal to the delay line Q15/Q16 (0.125 μsec) to produce new DSK HOLE signal (Ⓗ).

2. DSK HOLE signal selector circuit
   This circuit selects proper DSK HOLE signal generated in the step 1 above according to the selected DSK mode. Selection signals are DSK MATT/FILL CTL signal and EDGE ON/OFF signal, both of which are supplied from the control unit.
   DSK HOLE signals selected according to the DSK mode are explained in the following a) to c).

a) "POSI" or "NEGA" mode with EDGE ON
   DSK HOLE signal Ⓗ is supplied to the VIDEO board, and then it becomes the control signal of the DSK amp and DSK PVW amp.
   At the same time, DSK HOLE Ⓓ is supplied to the BC board as the MATT GATE signal to cut out DSK color signal.
   Namely, the EDGE EFFECT is s produced by extracting the main line signal with the wide DSK HOLE Ⓗ and inserting DSK COLOR signal which is cut out by the narrow DSK HOLE Ⓓ into the blank.

b) "POSI" or "NEGA" mode with EDGE OFF
   In case of the EDGE OFF, the DSK HOLE Ⓓ is supplied to the VIDEO board to be processed to become the control signal of the DSK amp and DSK PVW amp. DSK MATT GATE signal is cut out by IC19-A of the BC board, therefore, EDGE EFFECT does not take place.

c) "EXT" mode
   In the "EXT" mode, DSK HOLE Ⓒ is supplied to the VIDEO board, and thereafter it becomes the control signal of the DSK amp and DSK PVW amp. DSK MATTE GATE signal is supplied to the BC board, however it is not used since the DSK FILL VIDEO is selected in the BC board.



(a) EDGE ON (b) EDGE OFF

Fig. 5-17 EDGE ON/OFF

5.4 GENERATION OF FTB SIGNAL (VIDEO board)

FTB signal is originated from the FTB data which is produced by the AUTO circuit of the control unit and converted into DC level by the D/A converter of the VIDEO board and treated by its blanking. This FTB signal is used as the control signal of the FTB amp.
(For the AUTO circuit, refer to Section 2.4.3, and for the D/A converter, refer to Section 3.5.4 - 3.)

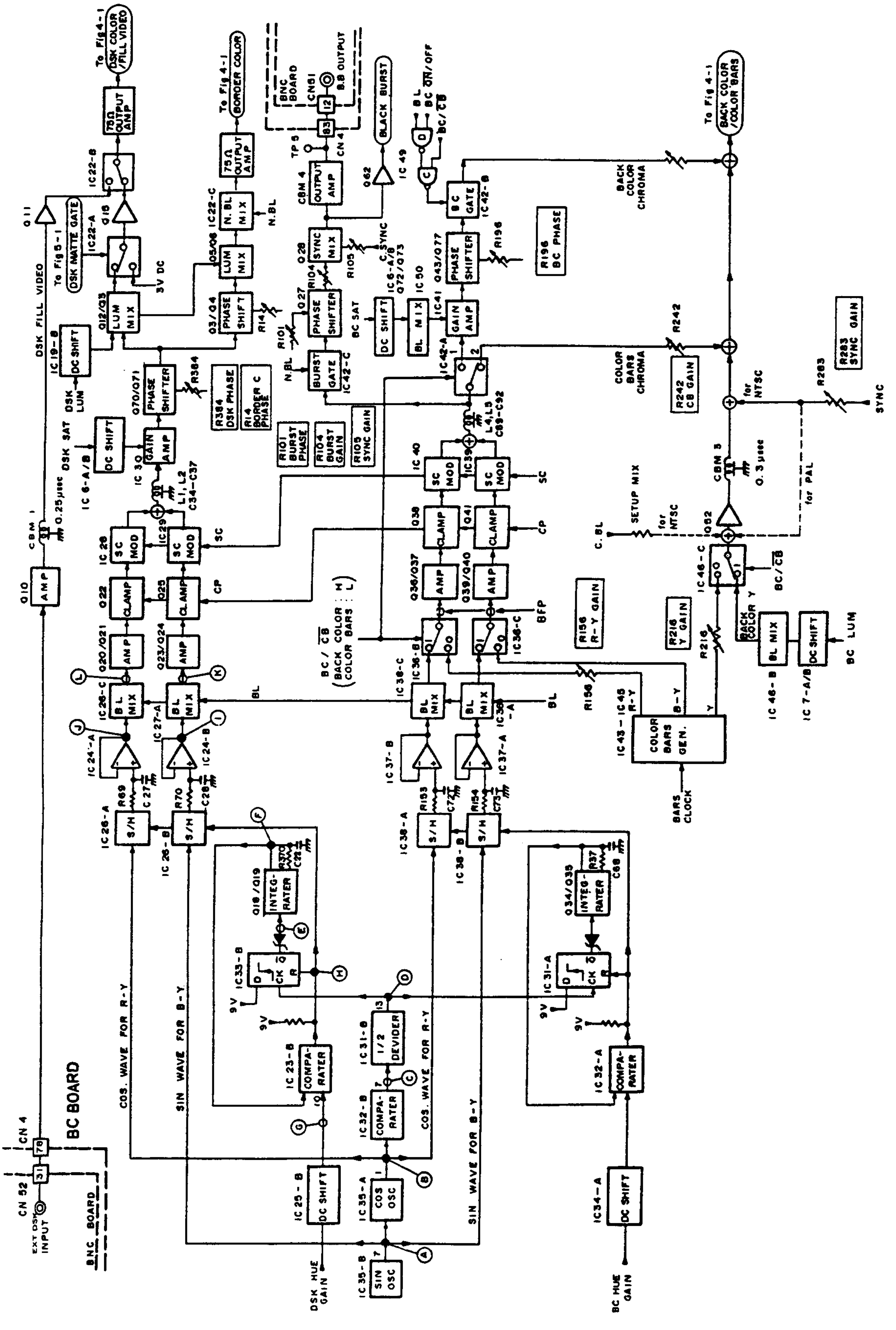

BC BOARD
BNC BOARD
CN 52
CN 4
EXT DSK INPUT
31
78
Q10
AMP
CBM 1
0.25μsec
DSK FILL VIDEO
Q11
To Fig 4-1
DSK COLOR /FILL VIDEO
75Ω OUTPUT AMP
IC22-B
Q15
IC22-A
To Fig 5-1
DSK MATTE GATE
5V DC
Q12/Q13
LUM MIX
IC 19-B
DC SHIFT
DSK LUN
Q70/Q71
PHASE SHIFTER
R384
R384 DSK PHASE
R14 BORDER C PHASE
DSK SAT
DC SHIFT
IC 6-A/B
IC 30
GAIN AMP
L1, L2
C34-C37
IC 28
SC MOD
IC29
SC
Q22
CLAMP
Q25
CP
Q20/Q21
AMP
Q23/Q24
IC 26-C
BL MIX
IC 27-A
BL
IC 24-A
IC 24-B
R69
C27
R70
C28
IC 26-A
S/H
IC 26-B
Q18/Q19
INTEG-RATER
R370
C22
IC 33-B
D
CK
R
9V
IC 23-B
COMPA-RATER
IC 31-B
1/2 DEVIDER
13
IC 32-B
IC 25-B
DC SHIFT
IC 35-A
COS OSC
IC 35-B
SIN OSC
DSK HUE GAIN
COS. WAVE FOR R-Y
SIN WAVE FOR B-Y
COS. WAVE FOR R-Y
SIN WAVE FOR B-Y
Q3/Q4
PHASE SHIFT
R14
Q5/Q6
LUM MIX
IC22-C
N. BL MIX
N. BL
75Ω OUTPUT AMP
To Fig 4-1
BORDER COLOR
Q27
R101
N.BL
BURST GATE
IC 42-C
PHASE SHIFTER
R104
Q28
SYNC MIX
R105
C.SYNC
IC 6-A/B
Q72/Q73
CBM 4
OUTPUT AMP
TP 5
CN 4
93
12
CN51
BNC BOARD
B.B OUTPUT
Q62
BLACK BURST
R101 BURST PHASE
R104 BURST GAIN
R105 SYNC GAIN
BC SAT
DC SHIFT
BL MIX
IC 50
IC41
GAIN AMP
Q43/Q77
PHASE SHIFTER
R196
BC GATE
IC 42-B
IC 49
BL
BC ON/OFF
BC/CB
R196 BC PHASE
BACK COLOR CHROMA
To Fig 4-1
BACK COLOR /COLOR BARS
IC 42-A
1
2
L4, L5
C89-C92
IC 40
SC MOD
IC39
Q38
CLAMP
Q41
Q36/Q37
AMP
Q39/Q40
BFP
BC / CB
BACK COLOR : H
COLOR BARS : L
IC 36-B
IC 36-C
IC 38-C
BL MIX
IC 38-A
R156
R156 R-Y GAIN
IC 37-B
IC 37-A
R153
C72
R154
C73
IC 36-A
IC 36-B
S/H
Q34/Q35
INTEG-RATER
R37
C68
IC 31-A
IC 32-A
COMPA-RATER
IC34-A
DC SHIFT
BC HUE GAIN
IC 43 - IC 45
R-Y
B-Y
Y
COLOR BARS GEN.
BARS CLOCK
R216
R216 Y GAIN
BACK COLOR Y
IC 46-C
BC/CB
IC 46-B
BL MIX
IC 7-A/B
DC SHIFT
BC LUM
C. BL
SETUP MIX
for NTSC
Q52
CBM 5
0.3 μsec
for PAL
for NTSC
R283
SYNC
R283 SYNC GAIN
R242
COLOR BARS CHROMA
R242 CB GAIN
A
B
C
D
E
F
G
H
I
J
K
L

Fig. 6-1 Color signal generators block diagram

6. GENERATION OF COLOR SIGNAL (BC board)

KM-2500 generates the following color signals inside it.

1) DSK color signal
2) BORDER color signal
3) BACK color signal
4) COLOR BARS signal

These color signals are generated by the BC board, which generates B.B. (Black Burst) signal, too.
Fig. 6-1 shows a block diagram of the circuit .

6.1 MASTER OSCILLATOR

The MASTER OSCILLATOR is the signal source of the DSK color, BORDER color and BACK color, and it generates sine waveforms and cosine waveforms.
IC35-B is the sine waveform oscillator. IC35-A is the phase shifter, which produces cosine waveforms by shift the phase of sine waveform by 90°.
Output of the master oscillator is supplied to the DSK/ BORDER COLOR signal generator and BACK COLOR/ COLOR BARS signal generator.

6.2 DSK/BORDER COLOR signal generator

DSK color signal and BORDER color signal are input signals to the DSK amp and BORDER amp of the VIDEO board, respectively, however, signal generator for the two is only one. BORDER color is produced by shifting the color phase of the DSK color signal by the phase shifter at the angle of 180°.

6.2.1 Generation of color difference signals

Color difference signals are obtained by sample holding of sine and cosine waveforms oscillated by the master oscillator at an optional timing.
Timing of sample holding is determined by the position of the DSK HUE control on the control panel. Sampled DC voltage is processed in the blanking and further becomes R-Y and B-Y signals.
IC26-A/B and IC24-A/B make up the sample holding circuit while IC23-B, IC33-B, Q18 and Q19 construct the control circuit of sampling timing.
Fig. 6-2 shows waveforms at respective points of them.

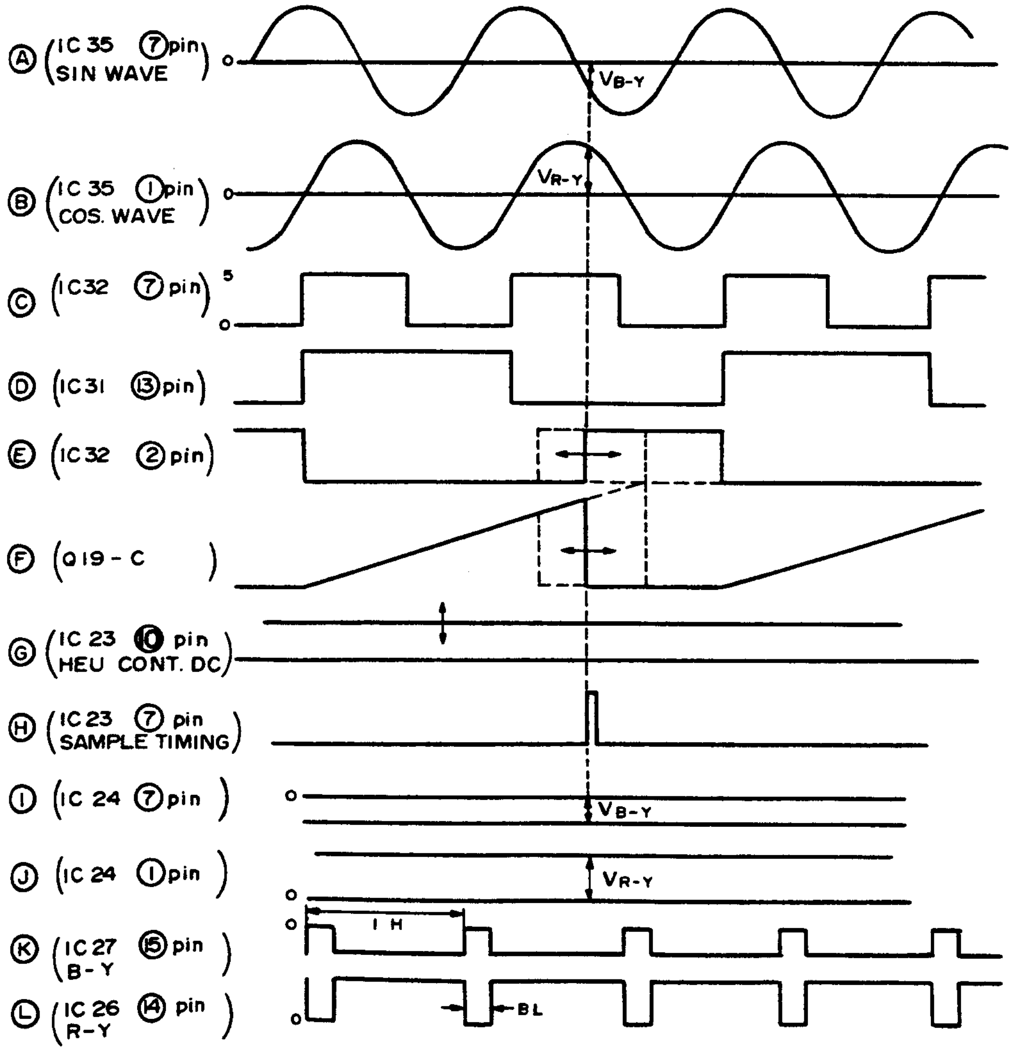

Ⓐ (IC 35 ⑦pin SIN WAVE)
0
VB-Y
Ⓑ (IC 35 ①pin COS. WAVE)
0
VR-Y
Ⓒ (IC32 ⑦pin)
5
0
Ⓓ (IC31 ⑬pin)
Ⓔ (IC32 ②pin)
Ⓕ (Q19-C)
Ⓖ (IC 23 ⑩ pin HEU CONT. DC)
Ⓗ (IC23 ⑦ pin SAMPLE TIMING)
Ⓘ (IC 24 ⑦pin)
0
VB-Y
Ⓙ (IC 24 ①pin)
VR-Y
0
Ⓚ (IC27 ⑮pin B-Y)
0
1 H
Ⓛ (IC 26 ⑭ pin R-Y)
0
BL

Fig. 6-2 Generation of color difference signals

6.2.2 Generation of color signal

Generated R-Y and B-Y color difference signals are respectively supplied to IC28 and IC29 in which they are modulated by the subcarrier and mixed to be color signal. The gain of color signal is adjusted by IC30 whose gain control depends on the set position of the SAT control on the control panel.

The signal whose gain is adjusted is branched in two lines.

In one route, it is mixed with luminance signal to be DSK color signal, while on the other line, its phase is shifted at the angle of 180° by the phase shifter Q3/Q4 and thereafter it is mixed with luminance signal to be BORDER color signal.

1. DSK color signal

   When the DSK mode is "POSI" or "NEGA" and EDGE effect is ON, DSK color signal is cut out by the DSK MATTE GATE signal and supplied to IC22-B.

   When EDGE effect is OFF, it directly enters IC22-B, which switches between EXT DSK signal and DSK color signal.

   When DSK mode is "POSI" or "NEGA", the switch selects DSK color signal while it selects EXT DSK color signal in the "EXT" mode. In either case, the signal is supplied to the DSK amp of the VIDEO board.

2. Generation of BORDER color signal

   BORDER color signal is processed by IC22-C by the blanking, first, and then supplied to the BORDER amp of the VIDEO board.

6.3 BACK COLOR/COLOR BARS SIGNAL GENERATOR

Either of BACK COLOR signal and COLOR BARS signal is selected by the COLOR MODE switch on the control panel. Therefore, some parts of the signal generation circuit is used in common to them.

6.3.1 Generation of color difference signals

Color difference signals of the BACK COLOR signal are obtained in the same manner as the generation of the color difference signals of the DSK/BORDER COLOR signal.

IC38-A/B and IC37-A/B make up the sample holding circuit while IC32-A, IC31-A, Q34, Q35 make up the sampling timing control circuit. Sample timing is determined by the position of the COLOR HUE control on the control panel.

On the other hand, color difference signals of the COLOR BARS signal are obtained by resistance mix of R, G, B signals which are divided bar-clock signal.

Color difference signals are supplied to IC36-B/C, which are the analog switches to put out one of these signals. The switching is determined by the COLOR MODE switch on the control panel.

6.3.2 Generation of color signal

R-Y and B-Y of generated color difference signals are respectively supplied to IC40 and IC39 in which they are modulated by the subcarrier and mixed with each other to become color signal.

The color signal flow is branched into two lines.

In one route, it enters B.B. (Black Burst) signal generator, in the other route, it enters IC42-A.

IC42-A is an analog switch controlled by the COLOR MODE switch on the control panel. When the COLOR mode is "COLOR BARS", the switch functions to output the input signal through pin ② whose output signal is mixed with Y signal of the COLOR BARS signal to become the color bars signal. If the COLOR mode is "BACK COLOR", the signal is output from pin ①. Output of pin ① is first adjusted by IC41 by the gain and then mixed with Y signal of the BACK COLOR signal to become back color signal. Gain of IC41 varies according to the position of the COLOR SAT control on the control panel.

Obtained BACK COLOR signal or COLOR BARS signal is supplied to the crosspoint circuit of the CP board.

6.4 B.B. signal generator

B.B. signal is originated from the color signal generated by the back color/color bars signal generator.

IC42-C is an analog switch which extracts burst component from the color signal at the right time of N. B L pulse.

Q28 mixes the extracted burst signal with sync signal to obtain B.B. signal.

B.B. signal flow is thereafter branched into two lines.

In a route, B.B. signal is put out from the B.B.-1 and B.B.-2 terminals via the output amp CBM4.

In the other route, the signal is supplied to the FTB amp of the VIDEO board, which puts out the signal after replacing the burst and sync signals of the video signal selected by the PROGRAM BUS with the burst and sync signals of the obtained B.B. signal.

SECTION 1
DISASSEMBLY

1.1 FUSE REPLACEMENT

Before replacing a fuse, the reason why it blew should be invested to prevent trouble from spreading. The malfunction should be repaired before replacing the fuse.

1. Set the POWER switch of the main unit to "OFF" and disconnect the power cord from an AC outlet.
2. The main fuse (primary fuse) F101 is changeable at the rear panel of main unit. Fuse is in the voltage selector.

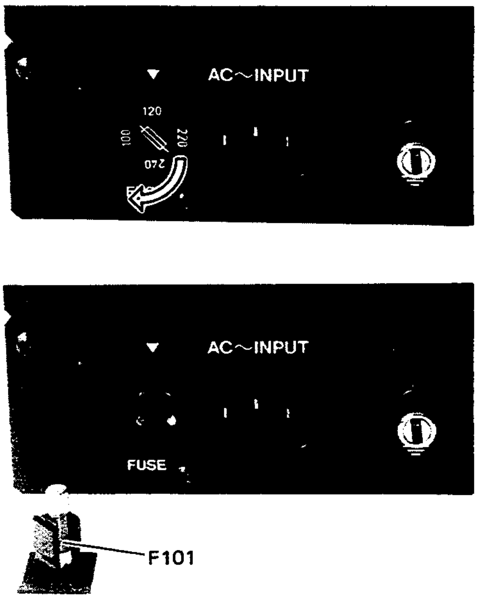

AC~INPUT
120
100
220
240
AC~INPUT
FUSE
F101

Fig. 1-1

3. Remove the top cover following to the section 1.3.2 "REMOVAL OF THE TOP COVER".
4. There are secondary fuses on the PS board.

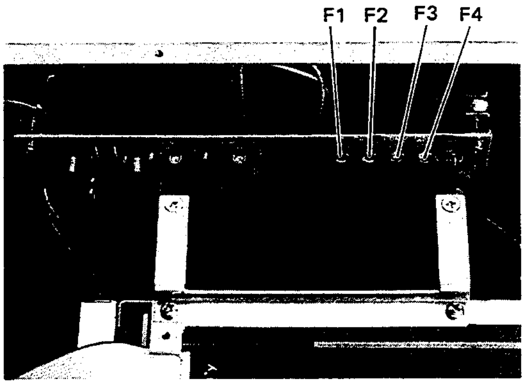


Fig. 1-2

For the safety and protection of the unit, replace only with fuses having specified part numbers.

	Symbol No.	Specifications	Part No.
Primary Fuse	F101 (U ver.)	1.6 A 125 V	QMF51J1-1R6
	F101 (E ver.)	T1A 250 V	QMF51A2-1R0
Secondary Fuses	F1 (U ver.)	2.5 A 125 V	QMF51J1-2R5
	F2	1.6 A 125 V	QMF51J1-1R6
	F3	2.5 A 125 V	QMF51J1-2R5
	F4	1.6 A 125 V	QMF51J1-1R6
	F1 (E ver.)	T2.5 A 250 V	QMF51A2-2R5
	F2	T1.6 A 250 V	QMF51A2-1R6
	F3	T2.5 A 250 V	QMF51A2-2R5
	F4	T1.6 A 250 V	QMF51A2-1R6

1.2 CONTROL UNIT

1.2.1 Removal of knob

1. Small knob

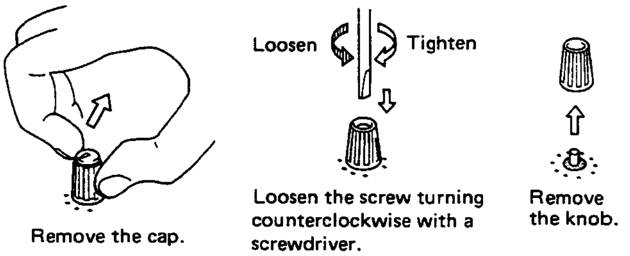

Loosen
Tighten
Remove the cap.
Loosen the screw turning counterclockwise with a screwdriver.
Remove the knob.

Fig. 1-3

2. Large knob

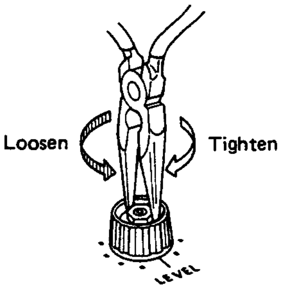
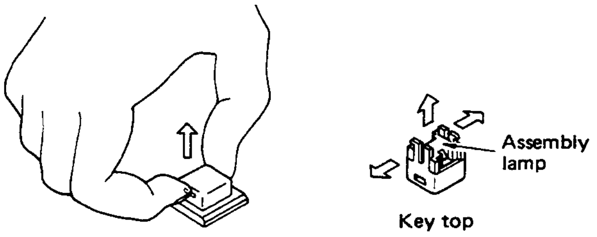

Loosen
Tighten
LEVEL

Fig. 1-4

1.2.2 Replacement of assembly lamps


Assembly lamp
Key top

Pull off the key top with a finger tip or a screwdriver by inserting its tip into the key slot.
Remove the assembly lamp out of the key top then insert a new lamp as before.

Fig. 1-5

1.2.3 Card fit cable connection

Note for conductors side on both of card cable and connector to mate.

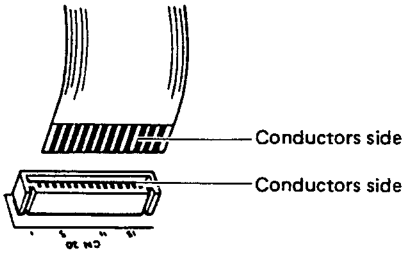

Conductors side
Conductors side

Fig. 1-6

1.2.4 Opening the control panel

1. Remove seven black screw ① , then open the control panel in the direction of the arrow.

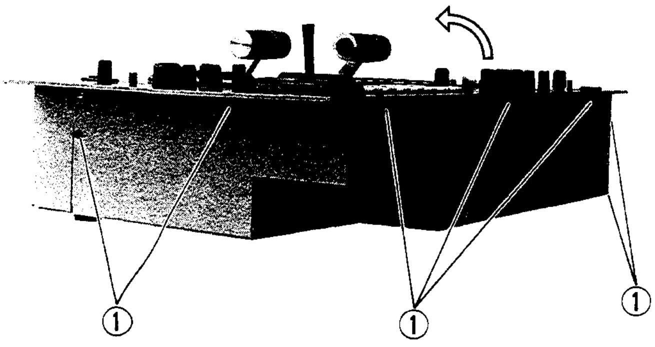


Fig. 1-7

1.2.5 Location of circuit boards

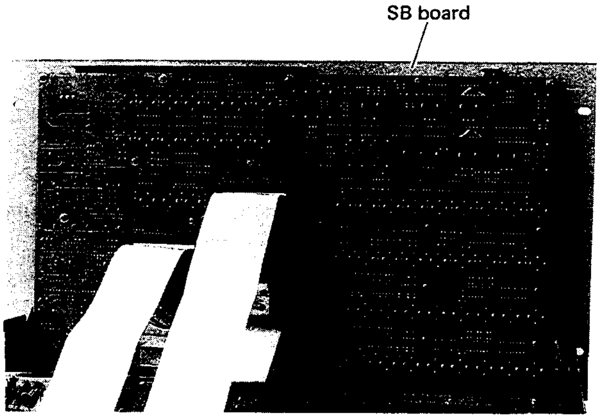


Fig. 1-8 (Panel side)

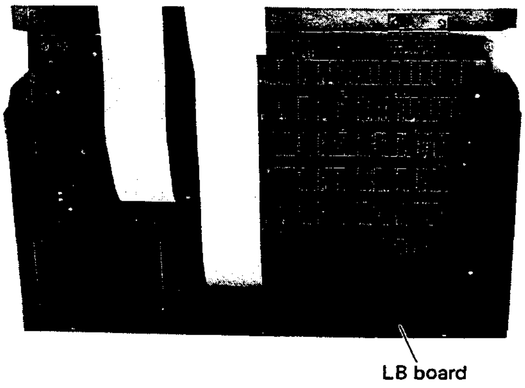


Fig. 1-9 (Bottom side)

1.2.6 Fader laver

a) Removal of the fader lever assembly.

MIX/SE lever as example. (For MIX lever, perform same manner as MIX/SE lever.)

1. Pull out two covers Ⓐ using philips screw driver.
2. Remove two screws ② .

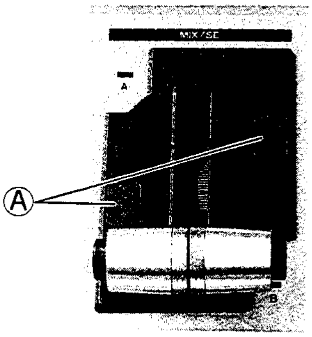


Fig. 1-10

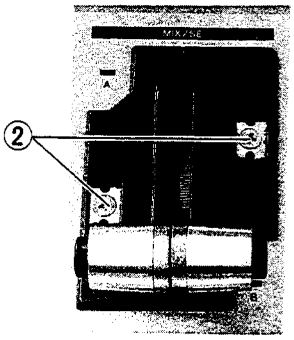


Fig. 1-11

3. Pull out the lever assembly and disconnect two connectors Ⓑ.

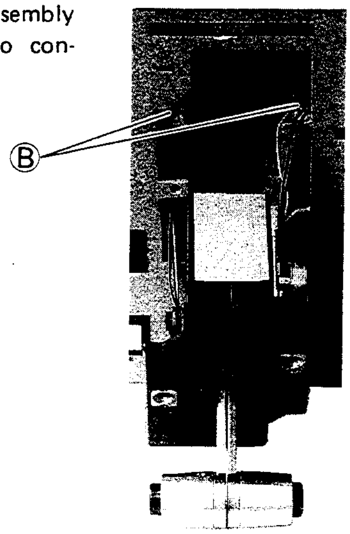


Fig. 1-12

b) Removal of the FADER VR

1. Remove the two screw ③ and pull the VR backward.

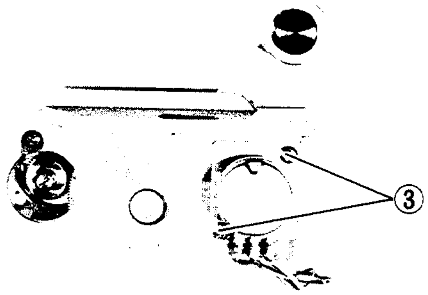


Fig. 1-13

2. Loosen the screw ④ with a hex-wrench and remove the gear. Then, loosen the nut ⑤ on the VR plate.

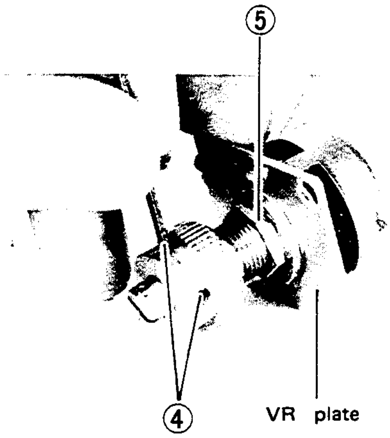


Fig. 1-14

c) Adjustment of FADER VR

1. Loosen the two screws ⑥ to remove the cover.

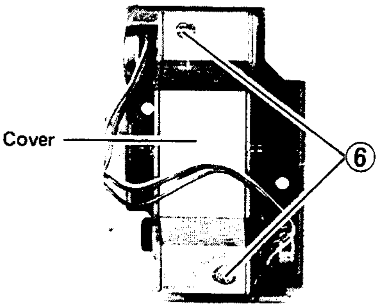


Fig. 1-15

2. Loosen the two screw ⑦ with a hex-wrench.

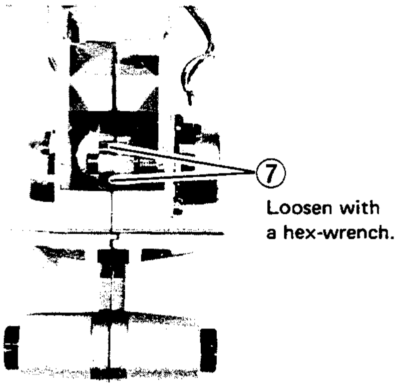
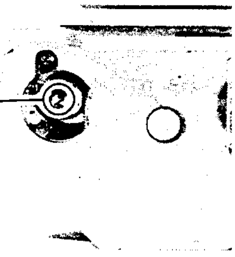


Fig. 1-16

3. Adjust the position using a flat blade screwdriver, and fix the VR with a hex-wrench after adjustment.



Adjust the setting position with a screwdriver.
Tighten the nut after adjustment.

Fig. 1-17

1.3 MAIN UNIT

1.3.1 Removal of the front cover

1. Loosen four screws ⑧ , then remove the front cover.

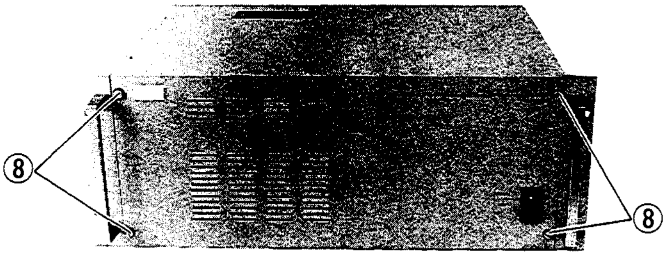


Fig. 1-18

1.3.2 Removal of the top cover

1. Remove eight screws ⑨ , then remove the top cover.

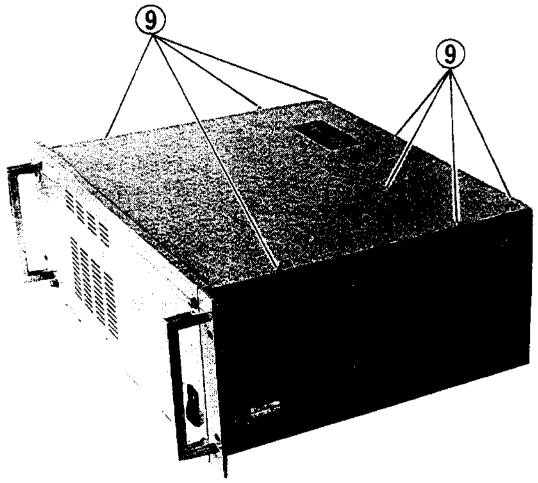


Fig. 1-19

1.3.3 Removal of the rear panel assembly

1. Remove five screws ⑩ on the rear panel and disconnect four connectors Ⓒ on the MT board, then remove the rear panel assembly.

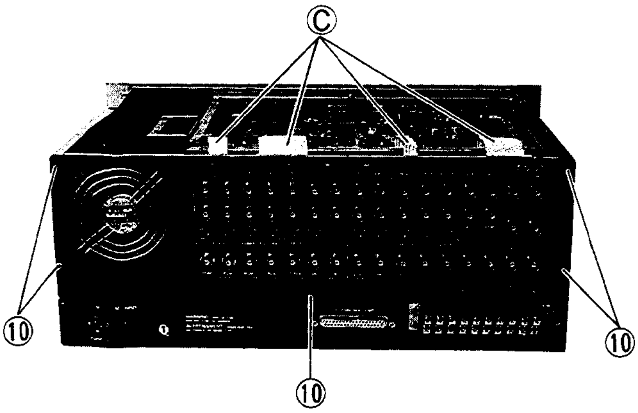


Fig. 1-20

2. By removing the rear panel the TL board can be checked.

1.3.4 Removal of the principal circuit boards

a) Loaction of the principal circuit boards

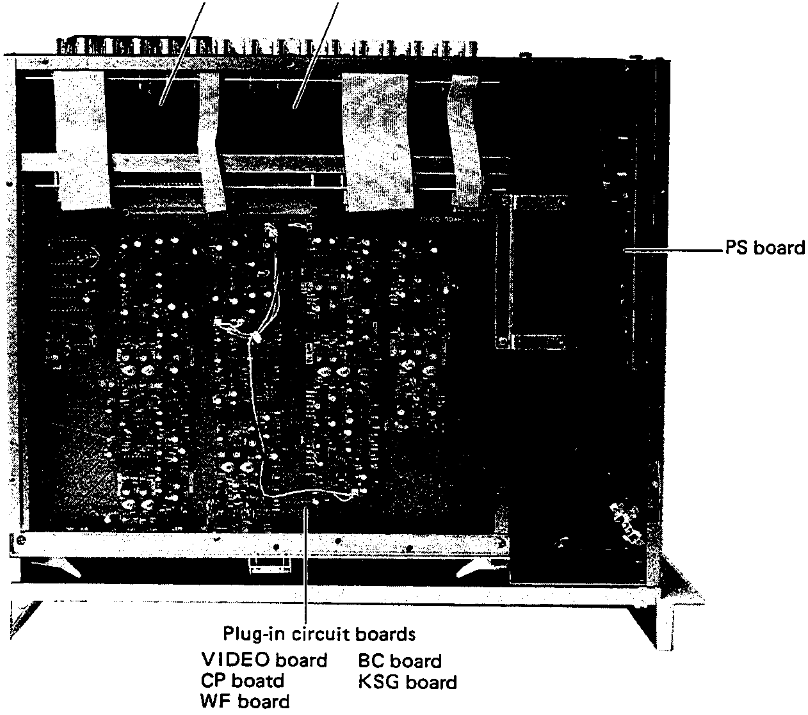

TL board
BNC board
PS board
Plug-in circuit boards
VIDEO board
BC board
CP boatd
KSG board
WF board

Fig. 1-21

b) Removal of the plug-in circuit boards

1. Remove the front cover folllowing to the section 1.3.1.
2. Loosen two screws ⑪ (cannot be removed), then remove the stopper Ⓓ .
3. Release the hooks Ⓔ (turn to front) on the both sides of the board simultaneously and pull the board out.

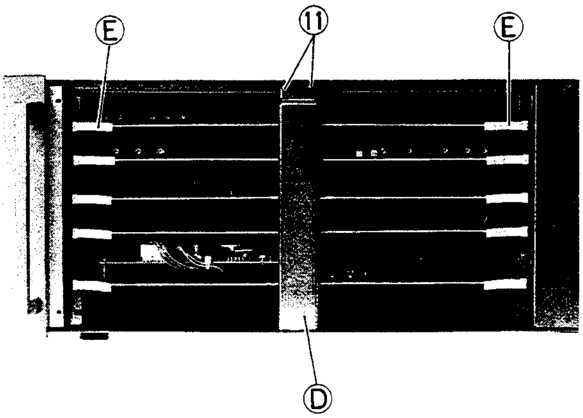


Fig. 1-22

c) Removal of the PS board

1. Remove the top cover following to the section 1.3.2.
2. Remove four screws ⑫ , then remove the PS board.

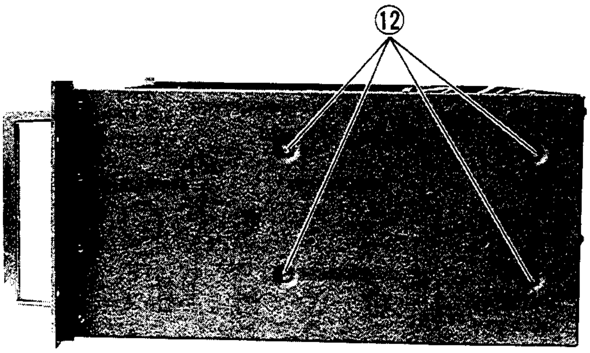
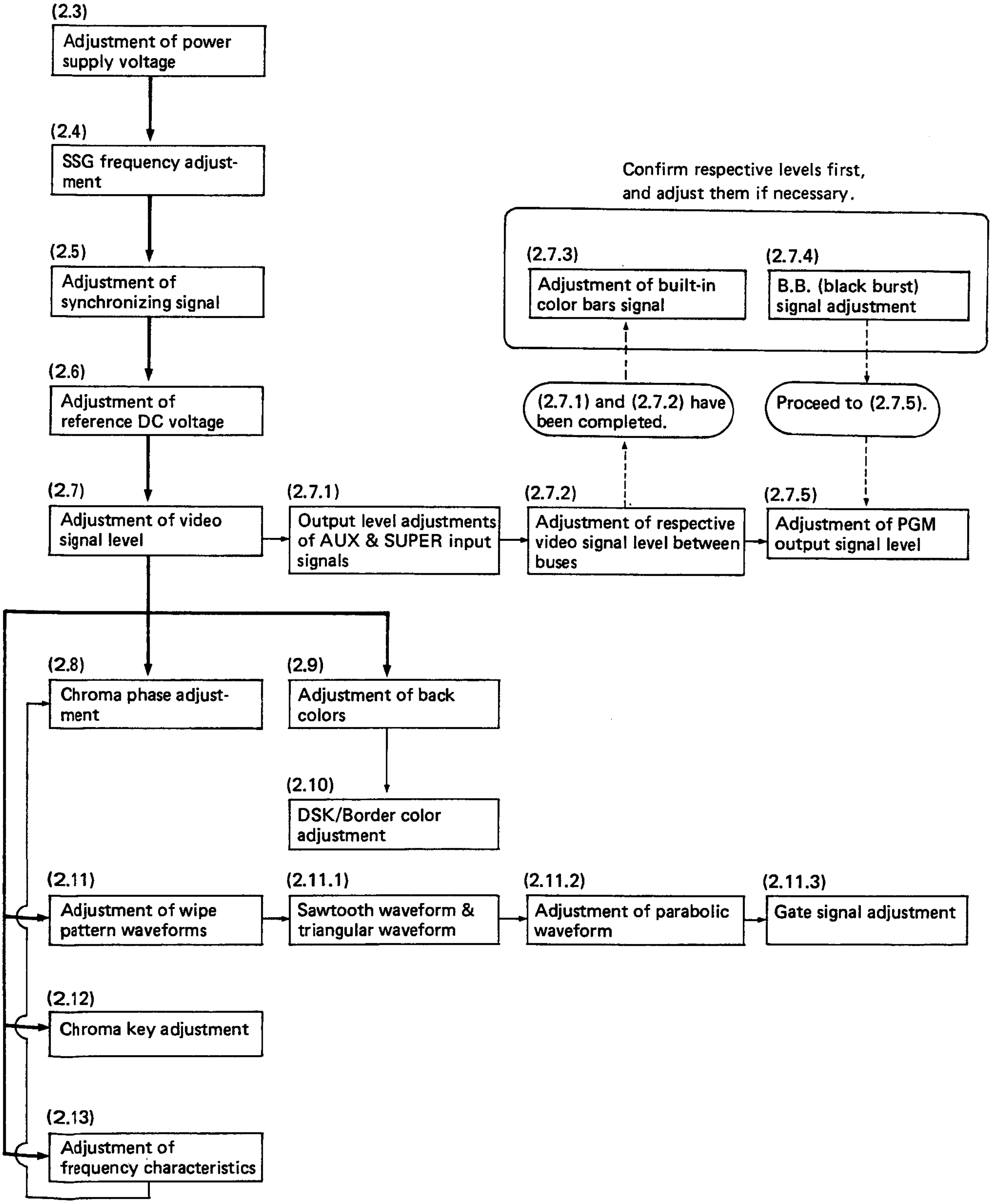


Fig. 1-23

SECTION 2
ADJUSTMENT PROCEDURE

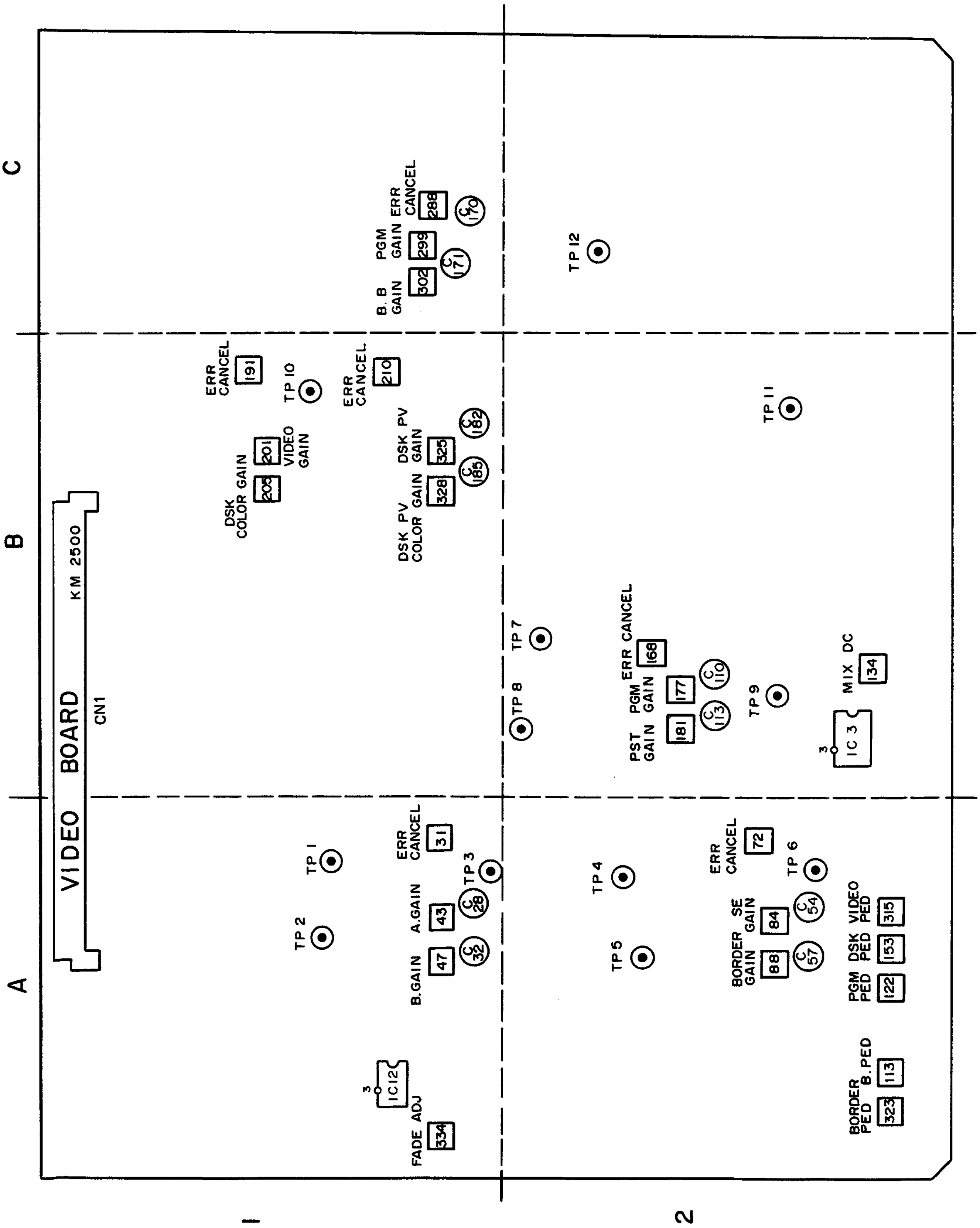
2.1 FLOWCHART OF ELECTRICAL ADJUSTMENTS

Note: Figures in parentheses (   ) show article numbers of the items.


(2.3)
Adjustment of power supply voltage
(2.4)
SSG frequency adjustment
(2.5)
Adjustment of synchronizing signal
(2.6)
Adjustment of reference DC voltage
(2.7)
Adjustment of video signal level
(2.7.1)
Output level adjustments of AUX & SUPER input signals
(2.7.2)
Adjustment of respective video signal level between buses
(2.7.5)
Adjustment of PGM output signal level
Confirm respective levels first, and adjust them if necessary.
(2.7.3)
Adjustment of built-in color bars signal
(2.7.4)
B.B. (black burst) signal adjustment
(2.7.1) and (2.7.2) have been completed.
Proceed to (2.7.5).
(2.8)
Chroma phase adjustment
(2.9)
Adjustment of back colors
(2.10)
DSK/Border color adjustment
(2.11)
Adjustment of wipe pattern waveforms
(2.11.1)
Sawtooth waveform & triangular waveform
(2.11.2)
Adjustment of parabolic waveform
(2.11.3)
Gate signal adjustment
(2.12)
Chroma key adjustment
(2.13)
Adjustment of frequency characteristics

It is required to confirm chroma phase.

■ ADJUSTMENT PARTS LOCATION OF VIDEO BOARD


A
B
C
1
2
VIDEO BOARD
KM 2500
CN1
TP 1
TP 2
TP 3
TP 4
TP 5
TP 6
TP 7
TP 8
TP 9
TP 10
TP 11
TP 12
ERR CANCEL
31
A.GAIN
43
B.GAIN
47
C 28
C 32
FADE ADJ
334
IC12
3
ERR CANCEL
72
SE GAIN
84
BORDER GAIN
88
C 54
C 57
VIDEO PED
315
DSK PED
153
PGM PED
122
B.PED
113
BORDER PED
323
MIX DC
134
IC 3
3
PST GAIN
181
PGM GAIN
177
ERR CANCEL
168
C 113
C 110
DSK COLOR GAIN
203
VIDEO GAIN
201
ERR CANCEL
191
ERR CANCEL
210
DSK PV GAIN
325
DSK PV COLOR GAIN
328
C 185
C 182
B.B GAIN
302
PGM GAIN
299
ERR CANCEL
288
C 171
C 170

2.2 REQUIRED EQUIPMENT AND STANDARD SETUP FOR ELECTRICAL ADJUSTMENTS

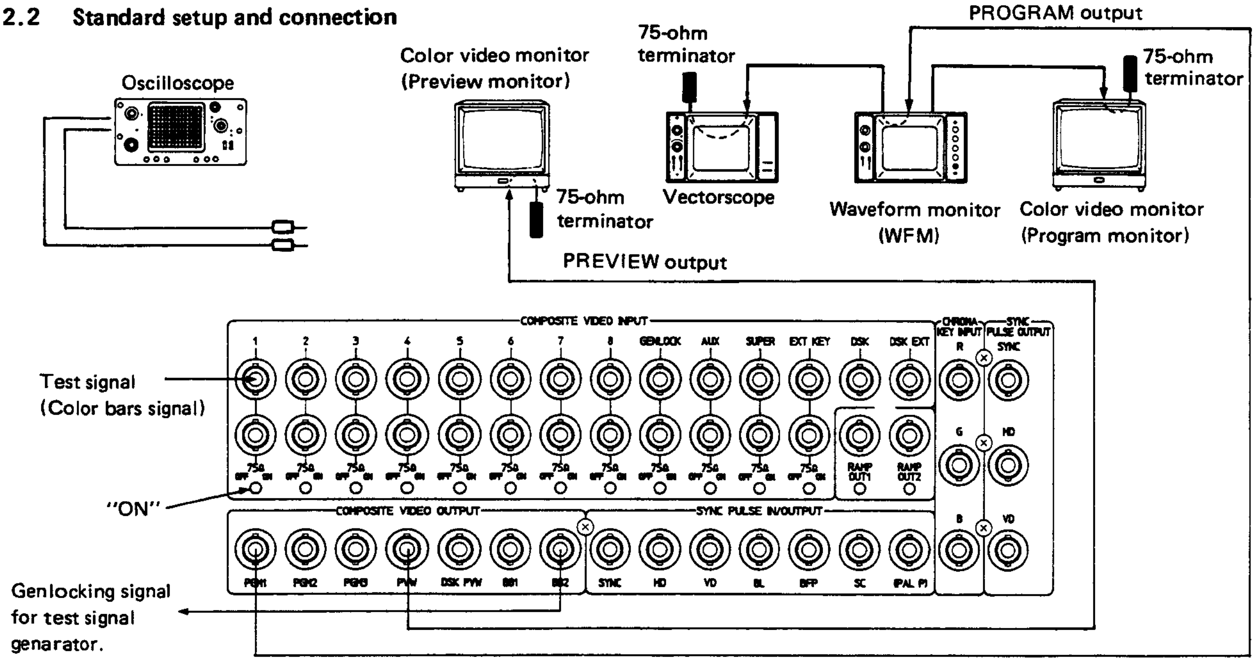
2.2.1 Necessary equipment and instruments

1. Test signal generator or color bars signal generator (For the former,it is recommended to prepare a cross hatch signal generator or a sweep signal generator.)
2. Extension board (SCK1075-00A) Extension board is not provided with KM-2500. This board is suplied for service parts.)
3. DC voltmeter (digital voltmeter is recommended)
4. Oscilloscope (dual-trace type is recommended)
5. Frequency counter
6. Color video monitor (underscan type is recommended)
7. Waveform monitor (WFM)
8. Vectorscope
9. Color video camera and remote control unit as indicated below (necessary for chroma key adjustment)

- Combination example

Color video camera	Remote control unit
KY-15 / KY-20	RM- P200

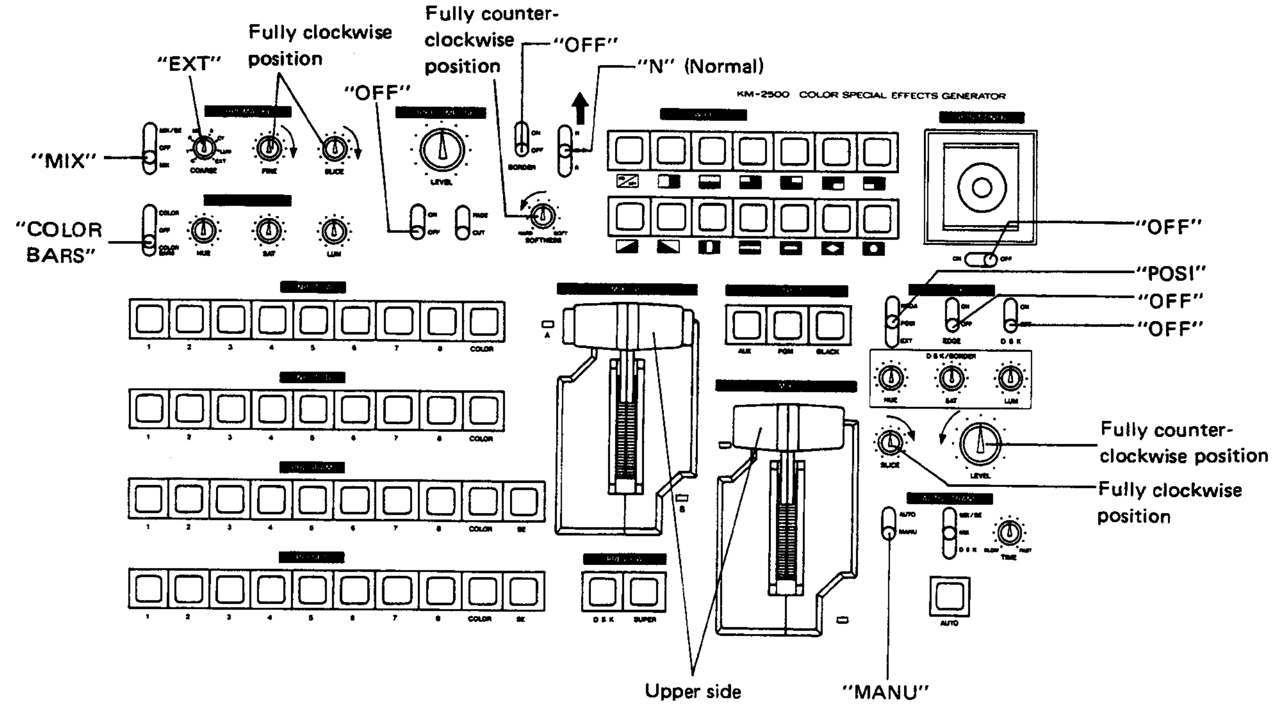
2.2.2 Standard setup and connection



PROGRAM output
75-ohm terminator
Color video monitor (Preview monitor)
75-ohm terminator
Oscilloscope
75-ohm terminator
Vectorscope
Waveform monitor (WFM)
Color video monitor (Program monitor)
PREVIEW output
COMPOSITE VIDEO INPUT
1
2
3
4
5
6
7
8
GENLOCK
AUX
SUPER
EXT KEY
DSK
DSK EXT
CHROMA KEY INPUT
R
G
B
SYNC PULSE OUTPUT
SYNC
HD
VD
RAMP OUT1
RAMP OUT2
COMPOSITE VIDEO OUTPUT
PGM1
PGM2
PGM3
PVW
DSK PVW
BB1
BB2
SYNC PULSE IN/OUTPUT
SYNC
HD
VD
BL
BFP
SC
PAL PI
Test signal (Color bars signal)
"ON"
Genlocking signal for test signal genarator.

2.2.3 Setting on the control panel

- Unless otherwise indicated, set the controls as shown in the figure below.



Fully counter-clockwise position
Fully clockwise position
"EXT"
"OFF"
"OFF"
"N" (Normal)
KM-2500 COLOR SPECIAL EFFECTS GENERATOR
"MIX"
"COLOR BARS"
"OFF"
"POSI"
"OFF"
"OFF"
Fully counter-clockwise position
Fully clockwise position
Upper side
"MANU"

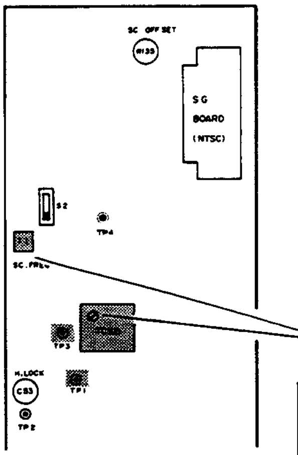
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (ⓣ) Adjustment level (☆)	Adjustment procedure

2.3 ADJUSTMENT OF POWER SUPPLY VOLTAGE

No.	Item	Measuring instruments & Input signals	Measuring point / Adjustment parts / Adjustment level	Adjustment procedure
1	+15 V DC power supply	Digital voltmeter	◎ TP1 ⓣ +15 V ADJ (R15)	1) Regulate the voltage to be +15 V ± 0.2 V DC.
2	+9 V DC power supply		◎ TP2 ⓣ +9 V ADJ (R8)	2) Regulate the voltage to be +9 V ± 0.2 V DC.
3	–9 V DC power supply		◎ TP3	3) Check that the voltage is –9 V ± 0.2 V DC at TP3.
4	+5 V DC power supply		◎ TP5 ◎ TP6	4) Check that the voltage +5 V ± 0.3 V DC at TP5.

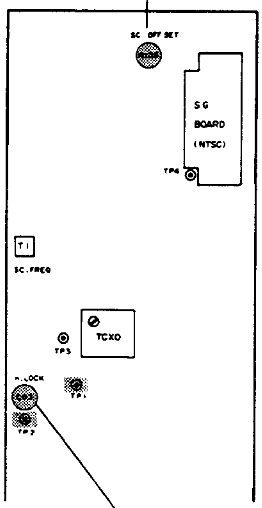
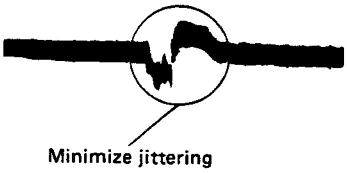
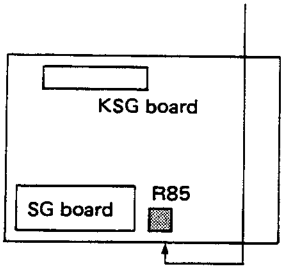
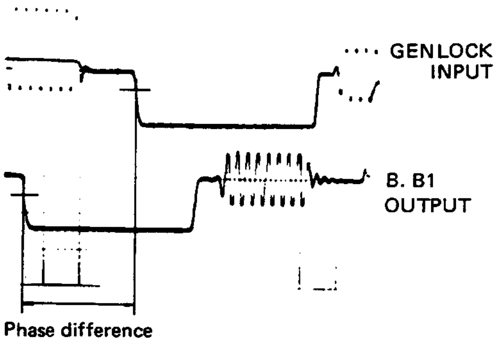
2.4-N SSG FREQUENCY ADJUSTMENT (NTSC version)

No.	Item	Measuring instruments & Input signals	Measuring point / Adjustment parts / Adjustment level	Adjustment procedure
1	SC frequency	Frequency counter Oscilloscope	• Connect the extention board to the KSG board.	● Warm up the set for more than 15 minutes after the power is turned on. ● Specifications of a frequency counter to be used: (1) Indication of 8 figures or more. (2) Stability of more than 0.1 ppm or 1 x 10^{-7} at 0°C to 40°C. 1) Adjust the following items for the specified values respectively (see Table below).

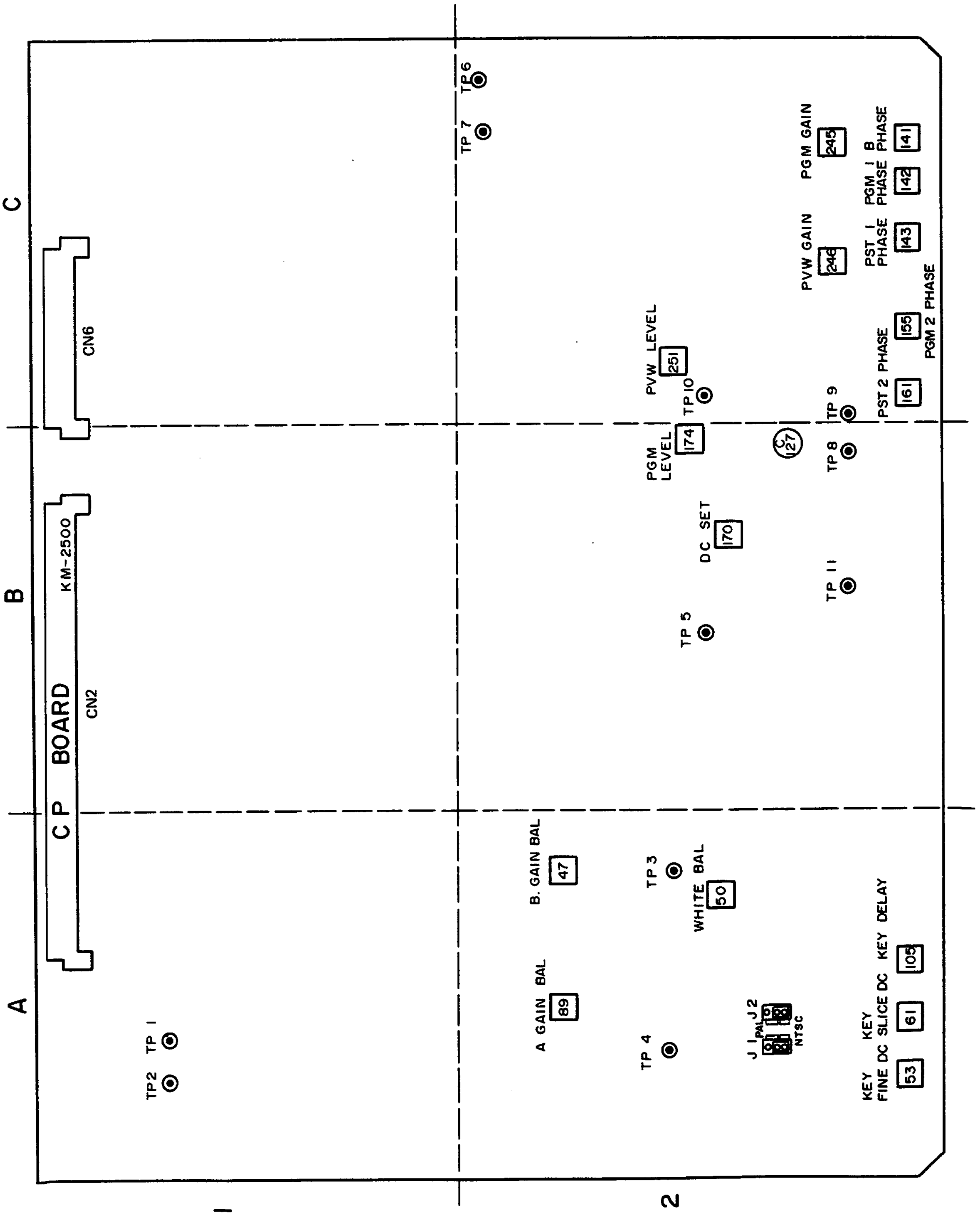


	Test points	Adjustment parts	Adjustment level
SC frequency	TP3 [SG board]	TXCO [SG board]	3.579545 MHz ± 5 Hz
SC output waveform	TP4 [SG board]	SC FREQ. (T1) [SG board]	Maximum output amplitude

Note: Since the adjustment of SC FREQ. (T1) results in H. PHASE alteration, make sure to perform the H. PHASE adjustment described in the following step No. 4 after this adjustment.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
2	Offset	Oscilloscope (V-rate)	◎ TP1 [SG board] Ⓣ OFFSET (R135) [SG board]  SC OFFSET SG BOARD (NTSC) TP4 T1 SC.FREQ TCXO TP3 H.LOCK TP1 TP2	• Connect a TV test signal generator to a GEN-LOCK INPUT terminal on the rear panel and supply VBS or BB (black burst) signal, while the other is terminated with a 75-ohm resistance. (75 Ω switch to ON) 1) Connect an oscilloscope to TP1 of the SG board. 2) Adjust R135 (OFFSET) to minimize jittering of the waveform as shown in the figure.  Minimize jittering
3	H. lock	Digital voltmeter	◎ TP2 [SG board] Ⓣ H. LOCK (C53) [SG board]	3) Adjust C53 to obtain 4.5 ± 0.2 V at TP2.
4	H. phase	Oscilloscope (H-rate)	Ⓣ H. PHASE (R85) [KSG board]  KSG board SG board R85	4) Turn the 75-ohm switch of the GENLOCK INPUT terminal to OFF, and connect a probe (CH-1) of a dual-trace oscilloscope to the terminal. 5) Connect the other probe (CH-2) of the oscilloscope to the B. B1 OUTPUT terminal. 6) Observing the two inputs on the oscilloscope at the same time, compare their phases (in H. SYNC portion). 7) Adjust R85 (H. PHASE) so that sync. signals of B. B1 output and GENLOCK input coincide with each other (see the figure below).  GENLOCK INPUT B. B1 OUTPUT Phase difference

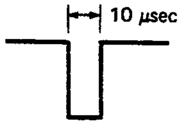
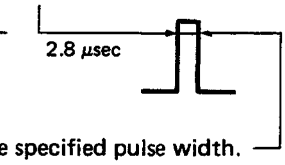
- **ADJUSTMENT PARTS LOCATION OF CP BOARD**


C
B
A
1
2
CP BOARD
KM-2500
CN6
CN2
TP6
TP 7
PGM GAIN
245
PGM 1 PHASE
142
B PHASE
141
PVW GAIN
246
PST 1 PHASE
143
PGM 2 PHASE
155
PST 2 PHASE
161
PVW LEVEL
251
TP 10
TP 9
PGM LEVEL
174
C 127
TP 8
DC SET
170
TP 11
TP 5
B. GAIN BAL
47
TP 3
WHITE BAL
50
A GAIN BAL
89
TP 4
J 1
J 2
PAL
NTSC
KEY FINE DC
53
KEY SLICE DC
61
KEY DELAY
105
TP 1
TP2

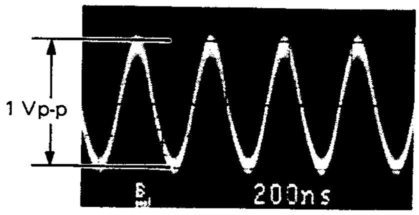
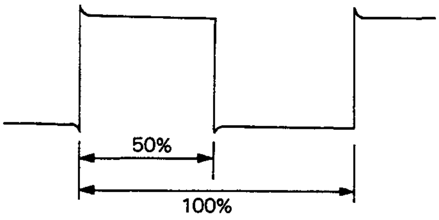
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

2.5 ADJUSTMENT OF SYNCHRONIZING SIGNAL

Note:
- For the following procedure, refer to "Adjustment parts location of BC board" on page 2-8 and "Adjustment parts location of KSG board" on page 2-10.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.

1	N. BL pulse	Oscilloscope (10 : 1, H-rate)	◎ TP2 [BC - 1C] Ⓣ N BL WIDTH (R4) [BC - 1C] ☆ 10 µsec	• Connect the extension board to the BC board. 1) Adjust R4 for the specified pulse width. 
2	CP (clock pulse)		NTSC version ◎ TP1 [BC - 1C] • CP WIDTH (R6) [BC - 1C]	**NTSC version** 2) Turn R6 fully counterclockwise. 3) Confirm the pulse width. 
			PAL version ◎ TP1 [BC - 1C] Ⓣ CP WIDTH (R6) [BC - 1C] ☆ 2.5 µsec	**PAL version** 2) Adjust R6 for the specified pulse width.

- **The following are adjustments for the EXT. pulse drive mode.**
  For the adjustments it is required to supply the reference sync. signal from the master SSG, and in general, they need no adjustments.

3	SC level	Oscilloscope (10 : 1, 200 nsec/div.) Ref. SC signal (2 Vp-p)	◎ CBM10 pin 3 [KSG - 2C] Ⓣ EXT SC LEVEL (R74) [KSG - 2C] ☆ 1 Vp-p	• Connect the extension board to the KSG board. 1) Set S1 and S2 on the KSG board to "EXT" position, respectively. 2) Supply the reference SC signal (2 Vp-p) from the master SSC to the SC terminal of the SYNC PULSE IN/OUTPUT connector of the rear panel. 3) Adjust R74 to set SC level as specified. 
4	PAL pulse (only for PAL version)	Oscilloscope (10 : 1, H-rate) (4 Vp-p)	◎ TP1 [KSG - 2A] Ⓣ PULSE WIDTH (R67) [KSG - 1A] ☆ 50% duty	4) Supply the reference PAL pulse (4 Vp-p) from the master SSG to the PAL. P terminal of the SYNC PULSE IN/OUTPUT connector of the rear panel. 5) Adjust the pulse width for 50% in the pulse duty factor. 

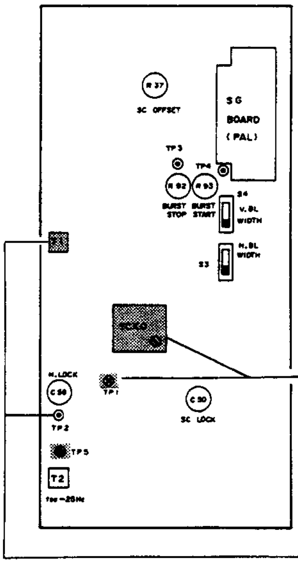
No.	Item	Measuring Instruments	Measuring Points, Adjusting Levels & Adjusting Points	Procedures

2.3 ADJUSTMENT OF POWER SUPPLY VOLTAGE

- Refer to the page 2-3-N.

2.4-P SSG ADJUSTMENT (PAL version)

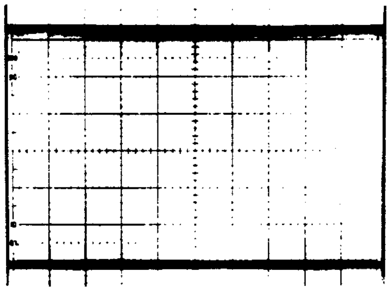
No.	Item	Measuring Instruments	Measuring Points, Adjusting Levels & Adjusting Points	Procedures
1	SC frequency adjustment	Frequency counter Oscilloscope		● Warm up the camera for more than 15 minutes, with the lens iris closed. ● The frequency counter is: 1) The 8 digits or more display is preferable. 2) Required of an accuracy of more than 0.1 ppm, or 1 x 10^{-7}, at 0°C to 40°C. ● Take out SG board 9 , attach an extension board and reset. (1) Adjust as shown in the tabel below.


R37
SC OFFSET
SG
BOARD
(PAL)
TP3
TP4
R92
R93
BURST STOP
BURST START
S4
V.BL WIDTH
H.BL WIDTH
S3
T1
TCXO
H.LOCK
C58
TP1
C50
SC LOCK
TP2
TP5
T2
fsc-25Hz

	Signal	Test Point	SG board
SC Frequency	4.433619 MHz ± 10 Hz	SG board TP1	TCXO
SC Output	Maximum Amplitude	SG board TP2	SC FREQ

No.	Item	Measuring Instruments	Measuring Points, Adjusting Levels & Adjusting Points	Procedures
2	Internal fsc-25Hz lock adjustment	Oscilloscope	fsc-25 Hz (T2) 282 fh LOCK (C58)	(1) Connect an oscilloscope to TP5 with H-rate time division. (2) Adjust core of transformer (T2) so that maximum output amplitude.

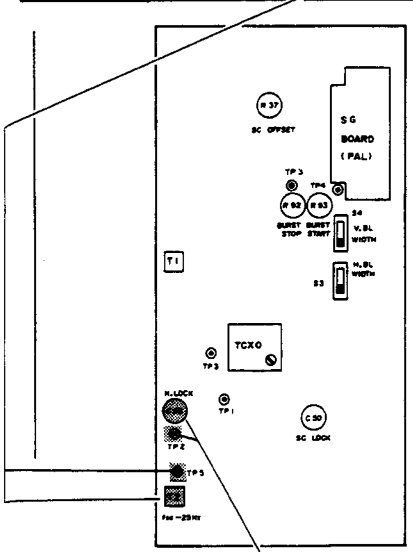
Test Point	Adjustment	
TP5	fsc-25 Hz (T2) Transformer	Maximum Output (3 Vp-p or more)



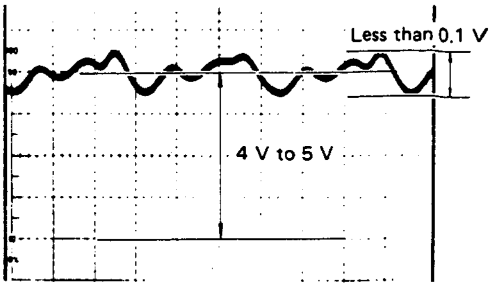
H-rate

(3) Connect an oscilloscope to TP2 with V-rate time division.

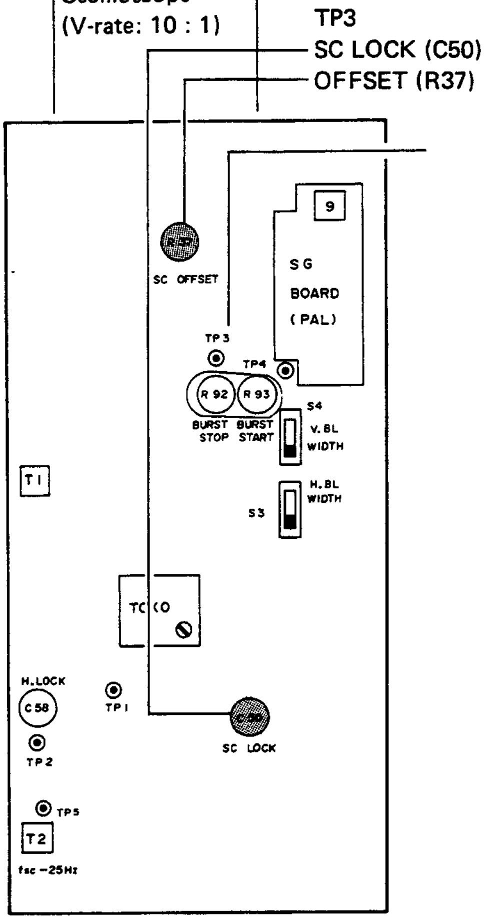
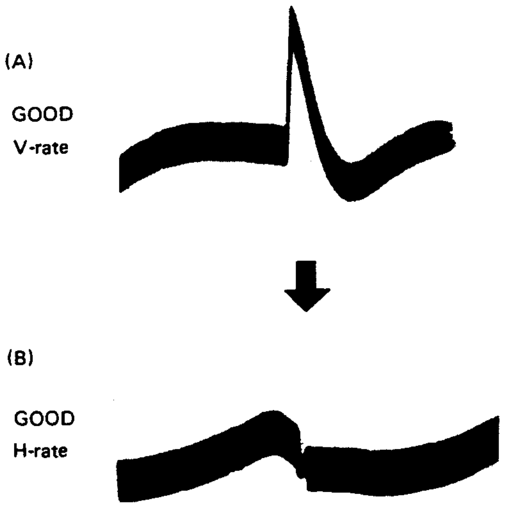
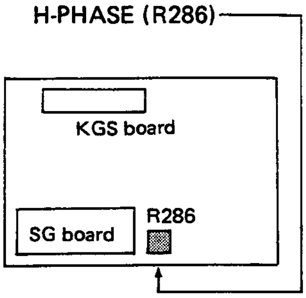
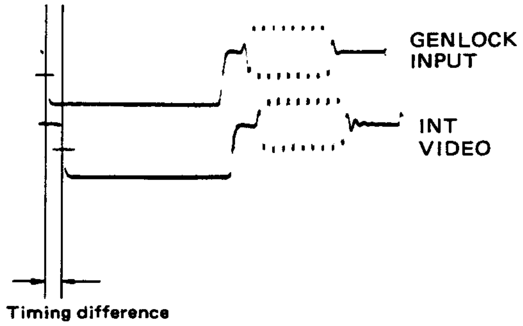
(4) Adjust trimmer capacitor (C58) so that averaged DC level of waveform is 4 V to 5 V and minimum ripple are observed.


R37
SC OFFSET
SG
BOARD
(PAL)
TP3
TP4
R92
R93
BURST STOP
BURST START
S4
V.BL WIDTH
H.BL WIDTH
S3
T1
TCXO
TP3
H.LOCK
TP1
C50
SC LOCK
TP2
TP5
fsc-25Hz

TP2	282 fh LOCK (C58) Trimmer capacitor	Ripple : Less than 0.1 V Average DC : 4 to 5 V



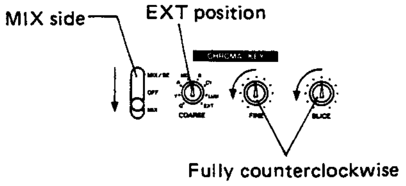
V-rate

No.	Items	Measuring Instruments	Measuring Points, Adjusting Levels & Adjusting Points	Procedures
3	SC LOCK adjustment	Digital voltmeter Oscilloscope (V-rate: 10 : 1)	 TP3 SC LOCK (C50) OFFSET (R37) SC OFFSET SG BOARD (PAL) 9 TP3 TP4 R 92 R 93 BURST STOP BURST START S4 V.BL WIDTH H.BL WIDTH S3 T1 TCXO H.LOCK C58 TP1 TP2 SC LOCK TP5 T2 fsc −25Hz	(1) Apply composite video or black burst signal from a sync pulse generator to the GENLOCK INPUT terminal of the camera. (2) Adjust SC LOCK (C50) so that the SG board TP3 DC level is 4.5 V ± 0.3 V. (3) Adjust OFFSET (R37) to minimize the waveform as shown below (jittering).  (4) Set the vectorscope, if used, to EXT LOCK, and adjust SC LOCK (C50) so that the jitter is minimized.
4	H-PHASE adjustment	Oscilloscope (H-rate: 10 : 1)	KSG board H-PHASE (R286)  KGS board SG board R286	(1) Turn the 75Ω switch of the GENLOCK INPUT to OFF, then connect A channel of a dual-trace oscilloscope to GENLOCK INPUT. (2) Connect the B CH oscilloscope input to the B.B-1 OUTPUT connector. (3) Observe the two inputs simultaneously on the oscilloscope and compare their phases. (4) Adjust the KSG board H-PHASE (R286) so that the internal video (camera output) H-sync is coincide with GENLOCK INPUT (external reference signal). 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure

2.6 ADJUSTMENT OF REFERENCE DC VOLTAGE

Note:
- For the following procedure, refer to "Adjustment parts location of WF board" on page 2-6 and "Adjustment parts location of VIDEO board" on page 2-2.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.

1	DSK SLICE DC voltage	Digital voltmeter	◎ IC6 pin 5 [WF - 1C] ⏀ DSK SLICE DC (R73) [WF - 1C] ☆ 3 V DC	● For setting the variable range of the DSK SLICE control for DSK. 1) Adjust R73 to obtain the specified level.
2	MIX DC (MIX/SE lever)		◎ IC48 pin 3 [WF - 2A] ⏀ MIX DC (R281) [WF - 2A] ☆ 3 V DC	● For setting the reference DC level for the MIX operation with the MIX/SE lever. 1) Adjust R281 to obtain the specified level.
3	KEY DC		◎ TP1 [CP - 1A] ⏀ KEY FINE DC (R53) [CP - 2A] ☆ 4.2 V DC	● For setting the variable range of the FINE and SLICE controls for chromakey. 1) Adjust the VRs to obtain the specified values respectively.
			◎ TP2 [CP - 1A] ⏀ KEY SLICE DC (R61) [CP - 2A] ☆ 5 V DC	
4	MIX DC (MIX lever)		◎ IC3 pin 3 [VIDEO - 2B] ⏀ MIX DC (R134) [VIDEO - 2B] ☆ 4.2 V DC	● For setting the reference DC level for the MIX operation with the MIX lever. **– Setting on the control panel –**  MIX side EXT position CHROMA KEY MIX/SE OFF MIX COARSE EXT FINE SLICE Fully counterclockwise 1) Set the level to be of the specified value.
5	FADE DC		◎ IC12 pin 3 [VIDEO - 1A] ⏀ FADE ADJ (R334) [VIDEO - 1A] ☆ 4.5 V DC	● For setting the reference DC level for the FADE operation (with the same setting on the control panel above). 1) Adjust for the specified level.

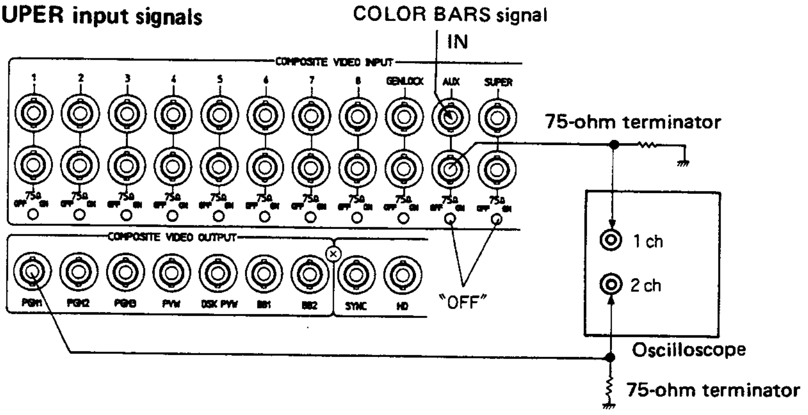
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

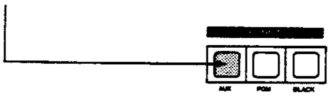
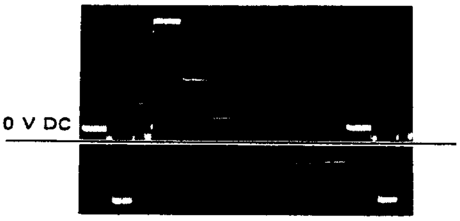
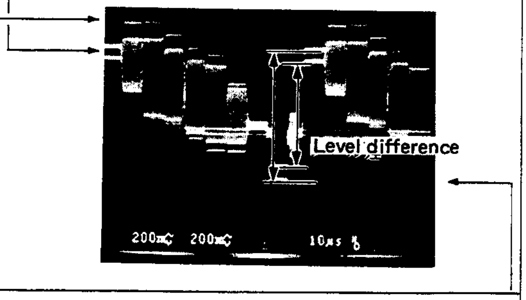
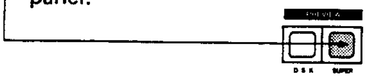
2.7 ADJUSTMENT OF VIDEO SIGNAL LEVEL

Note:
- For the following procedure, refer to "Adjustment parts location of VIDEO board" on page 2-2 and "Adjustment parts location of CP board" on page 2-4.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.

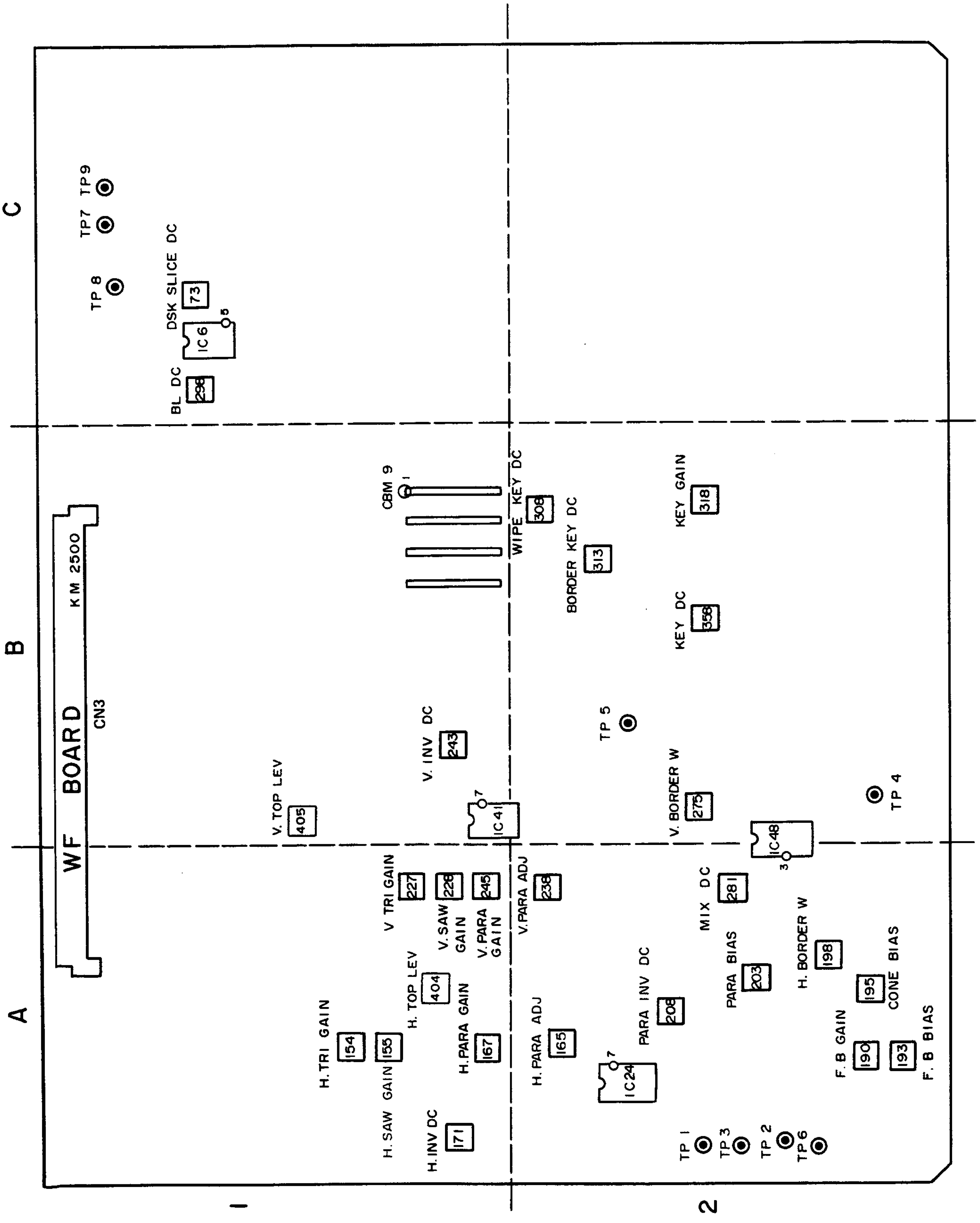
2.7.1 Output level adjustments of AUX and SUPER input signals

- **Connection of test equipment**


COLOR BARS signal
IN
COMPOSITE VIDEO INPUT
1
2
3
4
5
6
7
8
GENLOCK
AUX
SUPER
75-ohm terminator
75Ω
OFF
ON
COMPOSITE VIDEO OUTPUT
PGM1
PGM2
PGM3
PVW
DSK PVW
BB1
BB2
SYNC
HD
"OFF"
1 ch
2 ch
Oscilloscope
75-ohm terminator

1	Output level of AUX IN signal	Oscilloscope (10 : 1, H-rate DC range) Color bars signal	• Connect the extention board to the CP board. ◎ PGM 1 (CH2 of the oscilloscope) Ⓣ DC SET (R170) [CP - 2B] ☆ Pedestal level: 0 V DC Ⓣ PGM LEVEL (R174) [CP - 2B] ☆ Same Y level on CH1 & CH2 Ⓣ C127 [CP - 2B] ☆ Same CHROMA level on CH1 & CH2	1) Press the AUX button on the control panel.  AUX PGM BLACK 2) Adjust the pedestal level to be 0 V DC.  3) Adjust the controls to obtain the same signal level (Y and CHROMA respectively) on CH1 and CH2 of the oscilloscope. 
2	Output level of SUPER IN signal		Ⓣ PVW LEVEL (R251) [CP - 2C] ☆ Same signal level on CH1 & CH2	1) Change connections of the two connector cables from the AUX terminal to the SUPER terminal. 2) Change connection of the connector cable from PGM-1 terminal to the PVW terminal. 3) Press the SUPER button on the control panel.  4) Adjust the VR to obtain the same signal level on CH1 and CH2 of the oscilloscope.

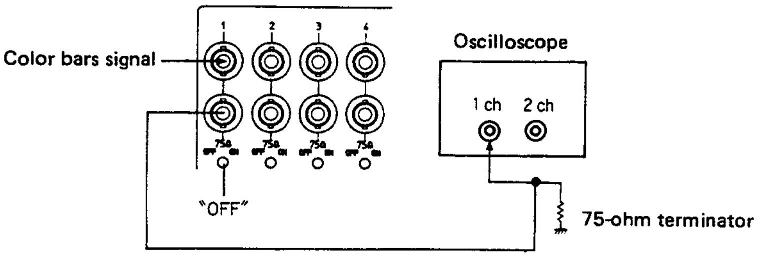
■ ADJUSTMENT PARTS LOCATION OF WF BOARD

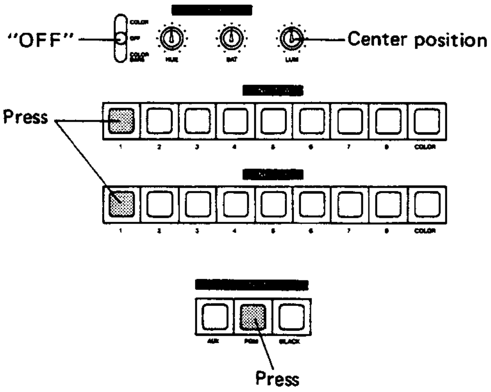
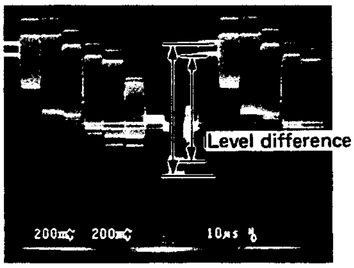
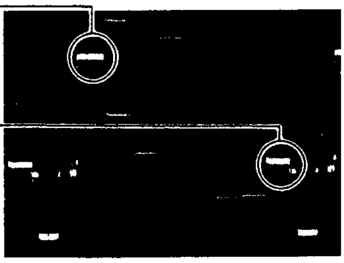

A
B
C
1
2
WF BOARD
KM 2500
CN3
CBM 9
TP 1
TP 2
TP 3
TP 4
TP 5
TP 6
TP7
TP 8
TP9
DSK SLICE DC
73
IC 6
BL DC
298
WIPE KEY DC
308
BORDER KEY DC
313
KEY GAIN
318
KEY DC
358
V. INV DC
243
V. TOP LEV
405
IC 41
V. BORDER W
275
IC48
V TRI GAIN
227
V. SAW GAIN
228
V. PARA GAIN
245
V. PARA ADJ
238
MIX DC
281
H. BORDER W
198
PARA BIAS
203
CONE BIAS
195
PARA INV DC
208
H. TOP LEV
404
H. PARA GAIN
167
H. PARA ADJ
165
H. TRI GAIN
154
155
H. SAW GAIN
H. INV DC
171
IC24
F. B GAIN
190
F. B BIAS
193

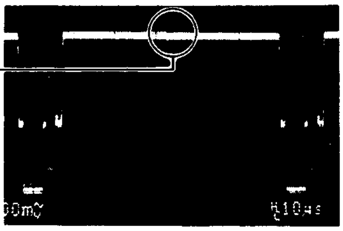
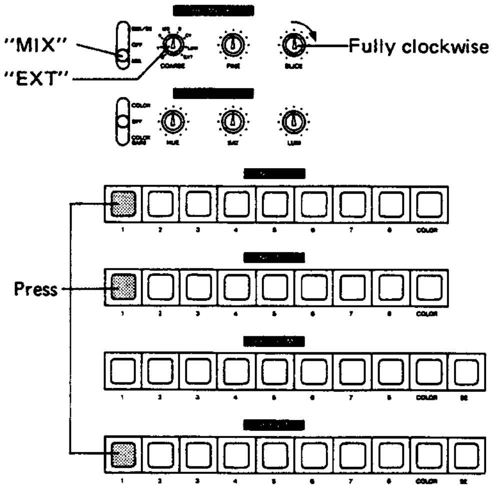
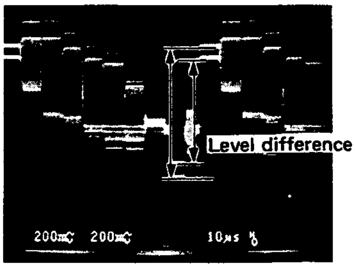
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

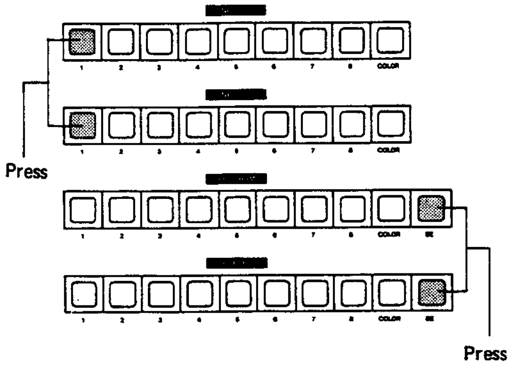
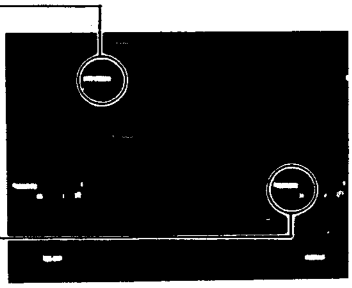
2.7.2 Adjustment of respective video signal level between buses

- **Connection of test equipment**

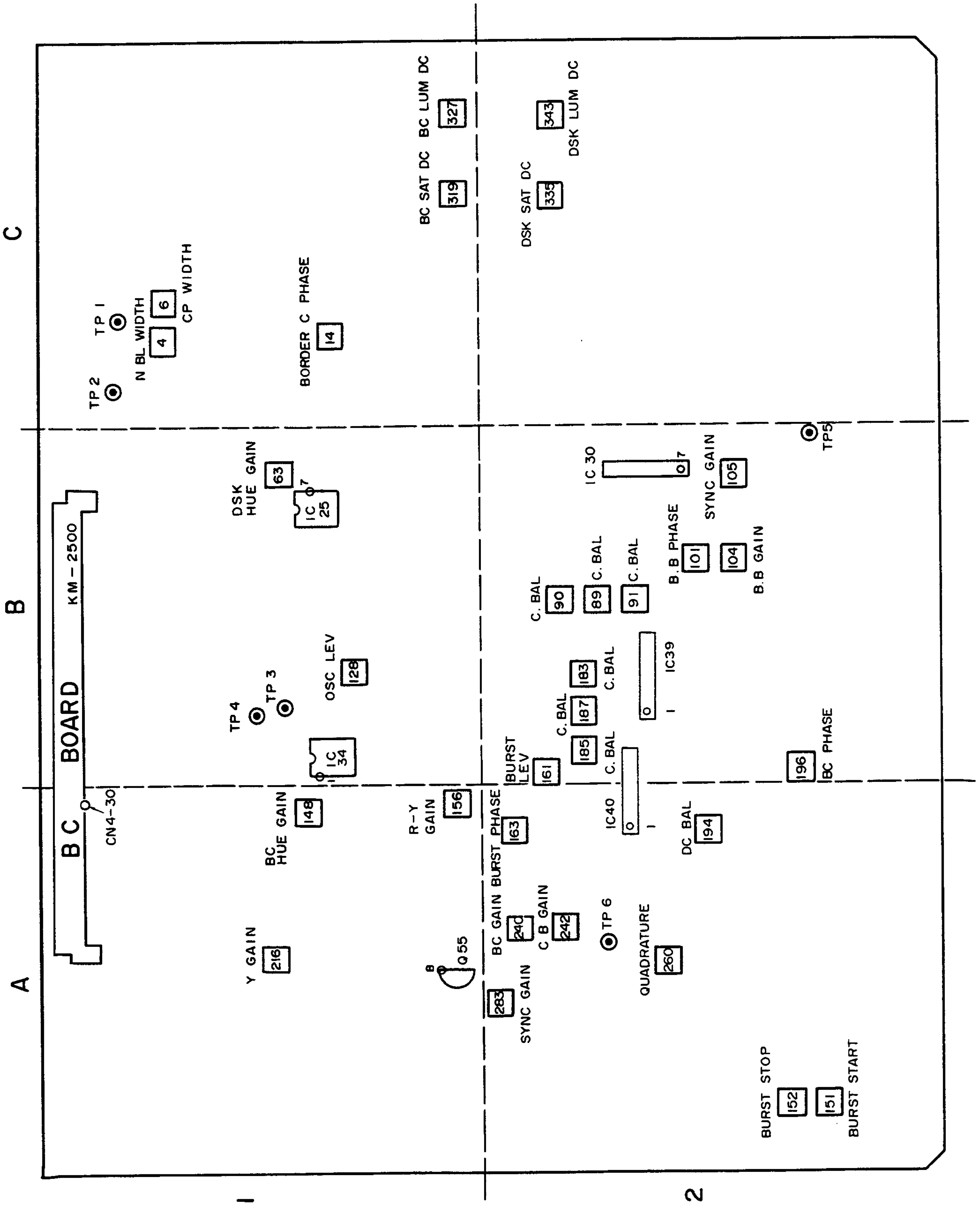

1
2
3
4
Color bars signal
75Ω
OFF ON
"OFF"
Oscilloscope
1 ch
2 ch
75-ohm terminator

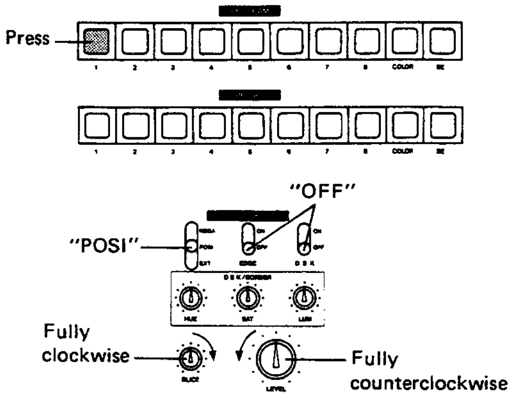
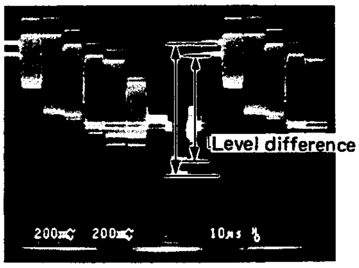
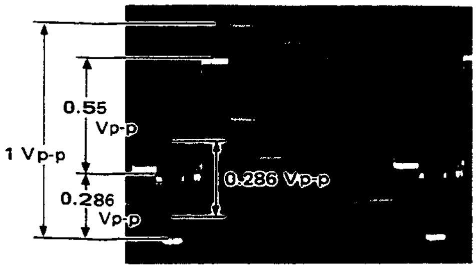
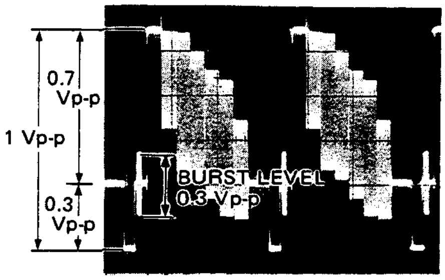
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
1	Signal level between buses A & B	Oscilloscope (10 : 1, H-rate)	• Take off the top cover of the main body to expose the VIDEO board. • Connect the extension board to the CP board. ◎ TP3 [VIDEO - 1A] Ⓣ A GAIN (R43) [VIDEO - 1A] ☆ Same signal level on CH1 & Ⓣ B GAIN (R47) [VIDEO - 1A] ☆ Same Y signal level Ⓣ B PED (R113) [VIDEO - 2A] ☆ Same pedestal level	• **Setting on the control panel**  "OFF" Center position Press 1 2 3 4 5 6 7 8 COLOR AUX PGM BLACK Press 1) Turn the MIX/SE lever to the A-bus side. 2) Equalize signal levels on CH1 and CH2 (TP3) of the oscilloscope.  Level difference 200mV 200mV 10µs 3) Observe the waveform on CH2 (TP3) with the oscilloscope. 4) Alternately setting the MIX/SE lever to the A-bus side and B-bus side, adjust the VRs so that levels are the same. **Note:** Repeat this adjustment several times. 

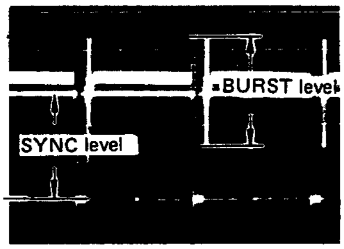
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (ⓣ) Adjustment level (☆)	Adjustment procedure
			ⓣ ERR CANCEL (R31) [VIDEO - 1A] ☆ Minimize serration	5) Select ◨ by the wipe pattern setting. 6) Select "COLOR" with the A-BUS and B-BUS select buttons, and set the MIX/SE lever to the center position. 7) Minimize the serration on the border of A-bus and B-bus images. 
2	Signal level between PRESET bus & A/B bus	Oscilloscope (10 : 1, H-rate) Color bars	◎ PVW OUTPUT [Rear panel of Main unit] ⓣ PVW GAIN (R246) [CP - 2C] ☆ Same signal level for CH-1 & CH-2	● **Setting on the control panel**  1) Set the MIX/SE lever to "A BUS" side while the MIX lever to "PRESET BUS" side. 2) Change the oscilloscope's CH-2 connection to the PVW OUTPUT terminal (with 75-ohm terminator). 3) Equalize CH-1 and CH-2 signal levels of the oscilloscope. 
			◎ TP9 [VIDEO - 2B] ⓣ PST GAIN (R181) [VIDEO - 2B] ☆ Same signal level ⓣ SE GAIN (R84)[VIDEO - 2A] ☆ Same signal level	4) Change the oscilloscope's CH-2 connection to TP9 (no termination required). 5) Equalize CH-1 and CH-2 signal levels of the oscilloscope as same as in the step 3). 6) Observe the waveform of CH-2 only. 7) Setting the PRESET BUS SELECT button to "1" and "SE" alternately, stabilize the signal level with the SE GAIN control.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
3	Signal level between PRESET bus & PROGRAM bus	Oscilloscope (10 : 1, H-rate)		● **Setting on the control panel** 
			◎ TP9 [VIDEO - 2B]	1) Connect only CH-2 probe of the oscilloscope to TP9. 2) Switching the MIX lever between topmost position and bottommost position repeatedly, adjust VRs to keep the signal level same. **Note:** Repeat this adjustment several times.
			⦶ PGM GAIN (R177) [VIDEO - 2B] ☆ Same Y signal level ⦶ PGM PED (R122) [VIDEO - 2A] ☆ Same pedestal level	
			⦶ PGM GAIN (R245) [CP - 2C] ☆ Same signal level	3) Set the MIX lever to topmost position. 4) Switching the PROGRAM BUS select button to "1" and "SE" alternately, stabilize the signal level with PGM GAIN.

■ ADJUSTMENT PARTS LOCATION OF BC BOARD

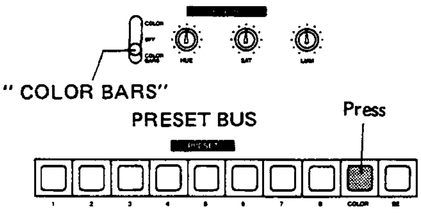
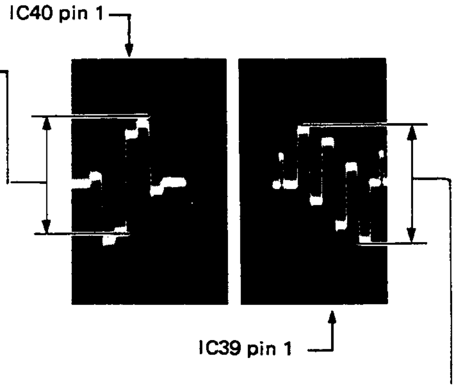

A
B
C
1
2
BC BOARD
KM-2500
CN4-30
TP 1
TP 2
TP 3
TP 4
TP 5
TP 6
4
N BL WIDTH
6
CP WIDTH
14
BORDER C PHASE
319
BC SAT DC
327
BC LUM DC
335
DSK SAT DC
343
DSK LUM DC
63
DSK HUE GAIN
IC 25
IC 30
105
SYNC GAIN
101
B.B PHASE
104
B.B GAIN
90
C. BAL
89
C. BAL
91
C. BAL
128
OSC LEV
IC 34
183
C. BAL
187
C. BAL
185
C. BAL
IC39
161
BURST LEV
IC40
196
BC PHASE
148
BC HUE GAIN
156
R-Y GAIN
163
BURST PHASE
194
DC BAL
240
BC GAIN
242
C B GAIN
260
QUADRATURE
216
Y GAIN
Q55
283
SYNC GAIN
152
BURST STOP
151
BURST START

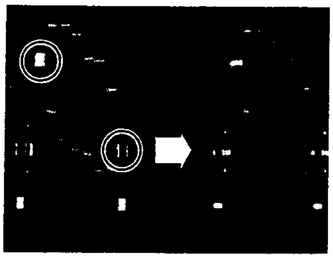
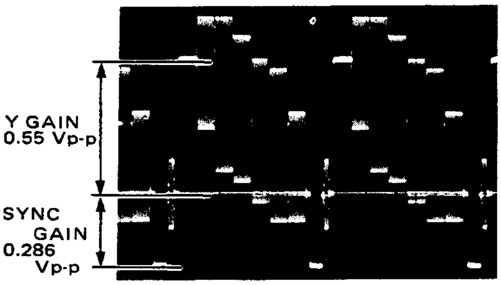
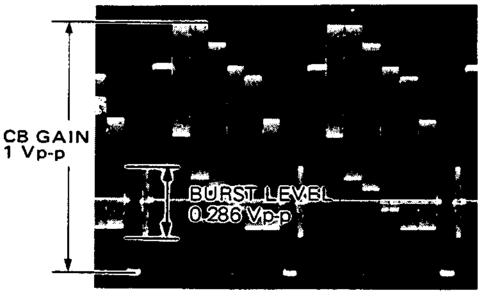
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
4	DSK PVW output signal level	Oscilloscope (10 : 1, H-rate)	◎ DSK PVW OUTPUT [Rear panel of Main unit] ⦶ DSK PV GAIN (R325) [VIDEO - 1B] ☆ Same signal level	• Setting on the control panel  Press "OFF" "POSI" Fully clockwise Fully counterclockwise 1) Connect the oscilloscope's CH-2 probe to the DSK PVW OUTPUT terminal (with 75-ohm terminator). 2) Equalize signal levels of CH-1 and CH-2 of the oscilloscope with the VR.  Level difference 200mV 200mV 10µs
5	DSK signal level (PROGRAM output line)	Oscilloscope (10 : 1, H-rate)	◎ TP10 [VIDEO - 1B] ⦶ VIDEO GAIN (R201) [VIDEO - 1B] ☆ Same signal level	1) Connect the oscilloscope's CH-2 probe to TP10 (no termination required). 2) Equalize signal levels of CH-1 and CH-2 of the oscilloscope with the VR.
6	Checkup of build-in color bars signal level **NTSC version** • Signal level: 1 Vp-p • Y signal level: 0.55 Vp-p • SYNC level: 0.286 Vp-p • BURST level: 0.286 Vp-p  1 Vp-p 0.55 Vp-p 0.286 Vp-p 0.286 Vp-p	Oscilloscope (10 : 1, H-rate) or WFM	◎ PVW OUTPUT [Rear panel of Main unit] **PAL version** • Signal level: 1 Vp-p • Y signal level: 0.7 Vp-p • SYNC level: 0.3 Vp-p • BURST level: 0.3 Vp-p  0.7 Vp-p 1 Vp-p 0.3 Vp-p BURST LEVEL 0.3 Vp-p	1) Select "COLOR" with the PRESET BUS select button. Set the select switch to "COLOR BARS" position. 2) Confirm respective levels of built-in color bars signal (with 75-ohm terminator). **Note:** If there is any difference in the levels, perform Sect. 2.7.3.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
7	Checkup of black burst signal's output level	Oscilloscope (10 : 1, H-rate) or WFM	◎ B.B. 1 [Rear panel of Main unit] **NTSC version** • Signal level: 0.43 Vp-p • SYNC level: 0.286 Vp-p • BURST level: 0.286 Vp-p **PAL version** • Signal level: 0.45 Vp-p • SYNC level: 0.3 Vp-p • BURST level: 0.3 Vp-p	1) Confirm the signal levels respectively (with 75-ohm terminator).  • If there is any difference in the signal levels, perform adjustments of Sect. 2.7.4.

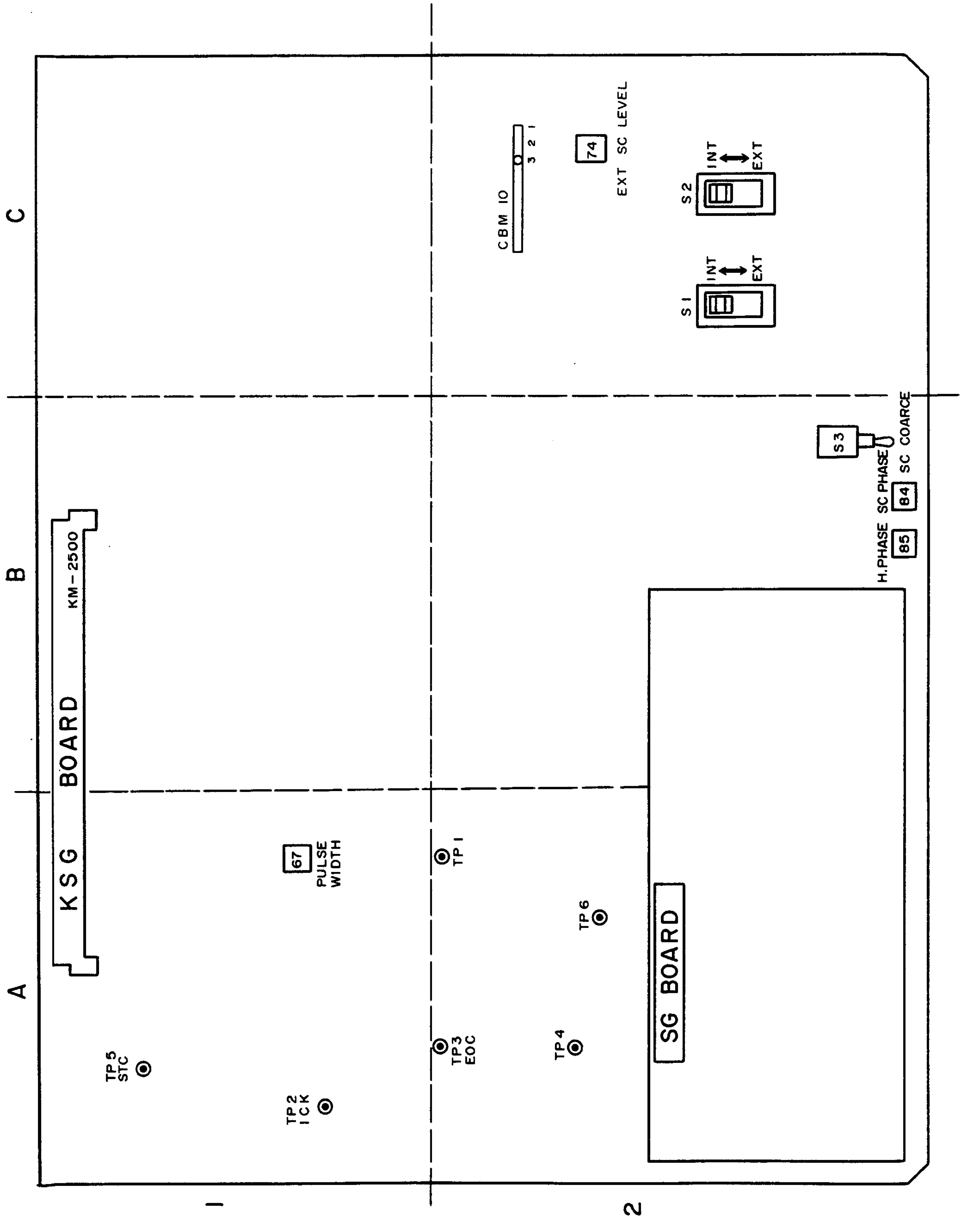
2.7.3-N Adjustment of built-in color bars signal level (NTSC version)

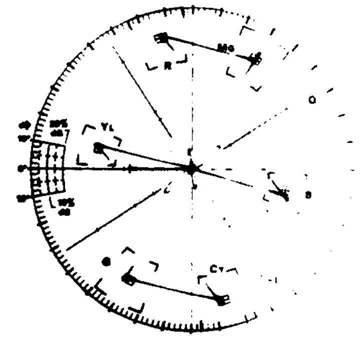
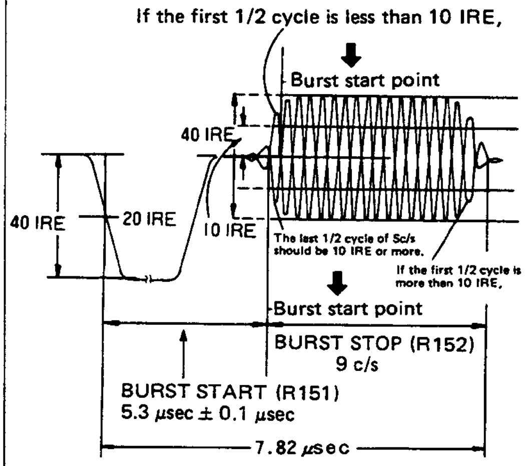
Note:
- For the following procedure, refer to "Adjustment parts location of BC board" on page 2-8.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.
- For adjustments of this section, it is the first condition that all the adjustments of Sections 2.7.1 and item 1 to 5 of 2.7.2 have been completed.
- After completion of this adjustment, it is required to perform adjustments described in Sections 2.7.4 and 2.7.5.

			• Extend the BC board with extension board.	• Seting on the control panel 
1	Color difference signal level	Oscilloscope (10 : 1, H-rate)	◎ IC40 pin 1 [BC - 2A] Ⓣ R-Y GAIN (R156) [BC - 2A] ☆ 1 Vp-p • IC39 pin 1 [BC - 2B] • 0.66 Vp-p	1) Adjust the signal levels as specified.  2) Confirm that the signal levels meet the specifications.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
2	Carrier balance	Oscilloscope (10 : 1, H-rate)	◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) ⦶ C BAL (R183) [BC - 2B] ⦶ C BAL (R185) [BC - 2B] ☆ Minimum carrier leaks	2) By turning the VRs alternately, minimize carrier leaks of the white and black sections. 
3	Video signal level (1)	WFM or Oscilloscope (10 : 1, H-rate)	◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) ⦶ Y GAIN (R216) [BC - 1A] ☆ 0.55 Vp-p (77 IRE) ◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) ⦶ SYNC GAIN (R283) [BC - 2A] ☆ 0.286 Vp-p (40 IRE)	3) Adjust level of Y GAIN first, and then for SYNC GAIN. 
4	Video signal level (2)		◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) ⦶ CB GAIN (R242) [BC - 2A] ☆ 1 Vp-p ⦶ BURST PHASE (R163) [BC - 2A] ☆ Mechanical center position ◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) ⦶ BURST LEVEL (R161) [BC - 2B] ☆ 0.286 Vp-p (40 IRE)	4) Adjust the CB GAIN first and then the BURST LEVEL to obtain the specified levels respectively. 

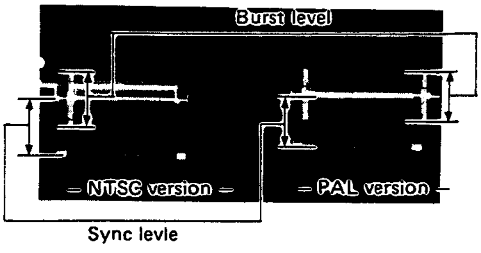
■ ADJUSTMENT PARTS LOCATION OF KSG BOARD


A
B
C
1
2
KSG BOARD
KM-2500
SG BOARD
TP5
STC
TP2
ICK
67
PULSE WIDTH
TP1
TP3
EOC
TP4
TP6
CBM 10
3 2 1
74
EXT SC LEVEL
S1
S2
INT
EXT
INT
EXT
S3
SC COARCE
84
SC PHASE
85
H.PHASE

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
5	Quadrature	Vectorscope ● If a vectorscope is unabailable, do not perform this adjustment. ● In the case respective signal's spot cannot be positioned at the specified point on the vectorscope by turning R260, adjust VRs of CB GAIN (R242), R-Y GAIN (R156) and QUADRATURE (R260) repeatedly in this order.	◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ QUADRATURE (R260) [BC - 2A]	5) Set the vectorscope's GAIN control to "CAL" or "75%" (preset) position.  6) Check if all spots (R, G, B, Mg, Cy and Y_L) are at the correct points (inside ⊞) on the vectorscope respectively. If not, proceed to the adjustment of the following step 7).
6	Burst point and width	WFM or Oscilloscope (10 : 1, H-rate)	◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ BURST START (R151) [BC - 2A] ☆ BURST STOP(R152)[BC-2A]	7) Perform adjustment as indicated below.  If the first 1/2 cycle is less than 10 IRE, Burst start point 40 IRE 40 IRE 20 IRE 10 IRE The last 1/2 cycle of Sc/s should be 10 IRE or more. If the first 1/2 cycle is more than 10 IRE, Burst start point BURST STOP (R152) 9 c/s BURST START (R151) 5.3 μsec ± 0.1 μsec 7.82 μsec

2.7.4 B. B. (Black Burst) signal adjustment (NTSC/PAL)

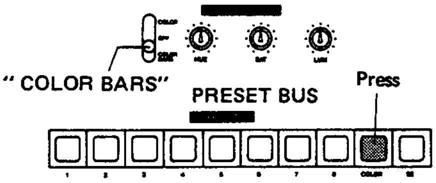
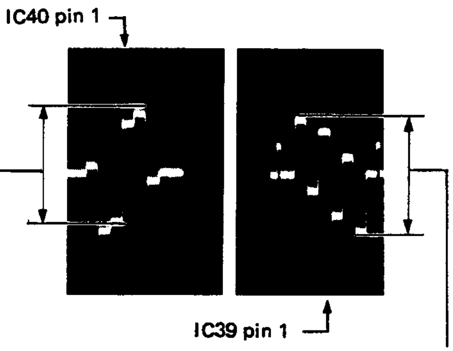
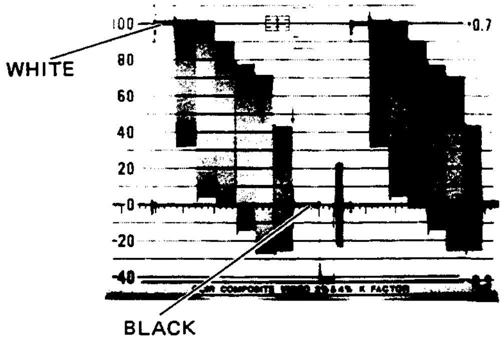
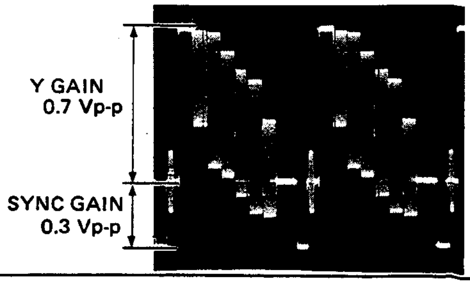
Note:
- For the following procedure, refer to "Adjustment parts location of BC board" on page 2-8.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.
- For adjustment of this section, it is the first condition that all the adjustments of Sections 2.7.1 through 2.7.3 have been completed.
- After completion of this adjustment, it is required to perform adjustments described in Section 2.7.5.

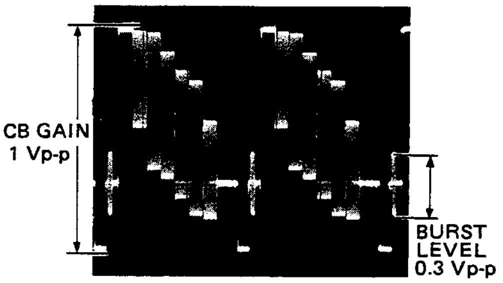
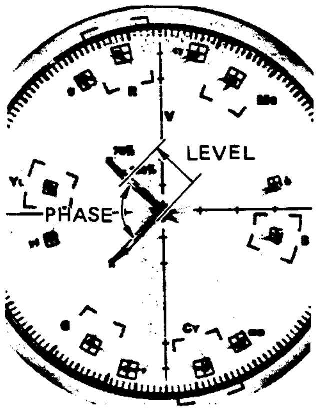
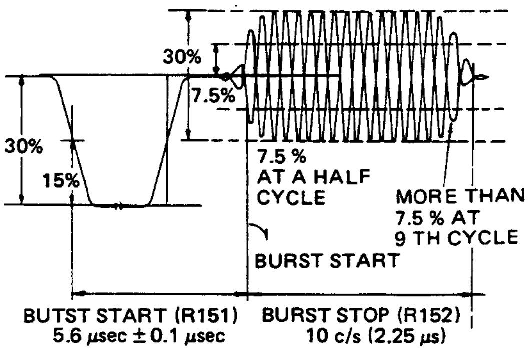
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
1	B.B. signal	WFM or Oscilloscope (10 : 1, H-rate) **NTSC version only** **NTSC and PAL version**	◎ B.B. 1 OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ B.B. PHASE (R101) [BC - 2B] ☆ Mechanical center position Ⓣ B.B. GAIN (R104) [BC - 2B] ☆ Burst level: 0.286 Vp-p (NTSC) 0.3 Vp-p (PAL) Ⓣ SYNC GAIN (R105)[BC - 2B] ☆ Sync. level: 0.286 Vp-p (NTSC) 0.3 Vp-p (PAL)	1) Adjust VRs to obtain the specified values respectively.  Burst level NTSC version PAL version Sync levle

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

2.7.3-P Adjustment of built-in color bars signal level (PAL version)

Note:
- For the following procedure, refer to "Adjustment parts location of BC board" on page 2-8.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.
- For adjustments of this section, it is the first condition that all the adjustments of Sections 2.7.1 and 2.7.2 have been completed.
- After completion of this adjustment, it is required to perform adjustments described in Sections 2.7.4 and 2.7.5.

1	Color difference signal level	Oscilloscope (10 : 1, H-rate)	◎ IC40 pin 1 [BC - 2A] Ⓣ R-Y GAIN (R156) [BC - 1A] ☆ 1 Vp-p ◎ IC39 pin 1 [BC - 2B] • 0.66 Vp-p	 1) Adjust the signal levels as specified.  2) Confirm that the signal levels meet the specifications.
2	Carrier balance		◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ C BAL (R183) [BC - 2B] Ⓣ C BAL (R185) [BC - 2B] ☆ Minimum carrier leaks Ⓣ C BAL (R187) ☆ Minimum carrier leak at each line.	3) Turn the VRs alternately to minimize carrier leak in the white and black portions.  4) Adjust R187 to minimize carrier leakage of each line. R187 minimizes the carrier leakage of V-axis.
3	Video signal level (1)	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ Y GAIN (R216) [BC - 1A] ☆ 0.7 Vp-p ◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ SYNC GAIN (R283) [BC - 2A] ☆ 0.3 Vp-p	5) Adjust level of Y GAIN first, and then for SYNC GAIN. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
4	Video signal level (2)	Oscilloscope (H-rate, 10 : 1)	◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ CB GAIN (R242) [BC - 2A] ☆ 1 Vp-p ◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ BURST LEVEL (R161) [BC - 2B] ☆ 0.3 Vp-p	6) Adjust CB GAIN and then BURST LEVEL for the specified levels respectively. 
5	Quadrature	Vectorscope ● **If a vectorscope is not available, do not perform this adjustment.** ● In the case respective signal's spot cannot be positioned at the specified point on the vectorscope by turning R260, adjust VRs of CB GAIN (R242), R-Y GAIN (R156) and QUADRATURE (R260) repeatedly in this order.	◎ PVW OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ QUADRATURE (R260) [BC - 2A] Ⓣ BURST PHASE (R163) [BC-2A] Ⓣ BURST LEVEL (R161) [BC-2B]	7) GAIN of vectorscope → CAL, or 75% (preset position) 8) Adjust VRs to set every spot (R, G, B, MG, CY, YL) at the specified point (with ⊞) on the vectorscope's screen as shown below.  9) Adjust R163 and R161 respectively for correct burst phase and burst level.
6	Burst point and width	Waveform monitor or Oscilloscope (H-rate, 10 : 1)	◎ PVW OUTPUT [Rear panel] (With 75-ohm terminator) Ⓣ BURST START (R151) [BC-2A] Ⓣ BURST STOP (R152) [BC-2A]	10) Perform this adjustment as follows:  30% 7.5% 30% 15% 7.5 % AT A HALF CYCLE MORE THAN 7.5 % AT 9 TH CYCLE BURST START BUTST START (R151) 5.6 µsec ± 0.1 µsec BURST STOP (R152) 10 c/s (2.25 µs)

2.7.4 B. B(Block Burst) signal adjustment

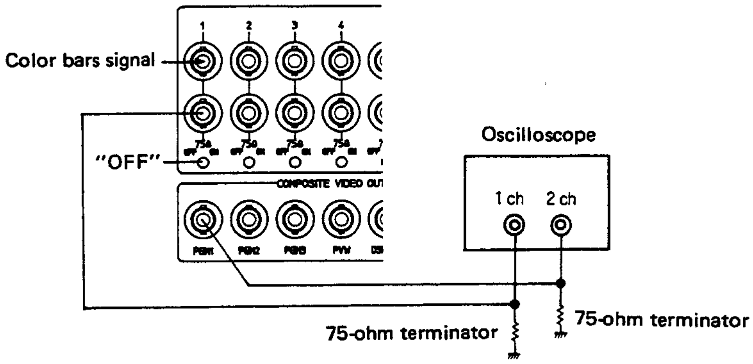
- Refer to the page 2-10-N.

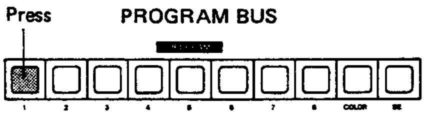
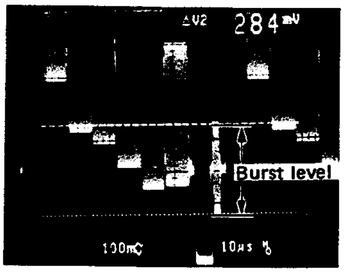
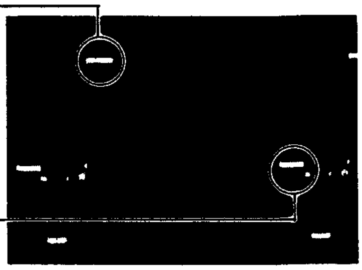
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⌽) Adjustment level (☆)	Adjustment procedure

2.7.5 Adjustment of PGM output signal level

Note:
- For the following procedure, refer to "Adjustment parts location of VIDEO board" on page 2-2.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.
- For adjustment of this section, it is the first condition that all the adjustments of Sections 2.7.1 through 2.7.4 have been completed.

- **Connection of test equipment**

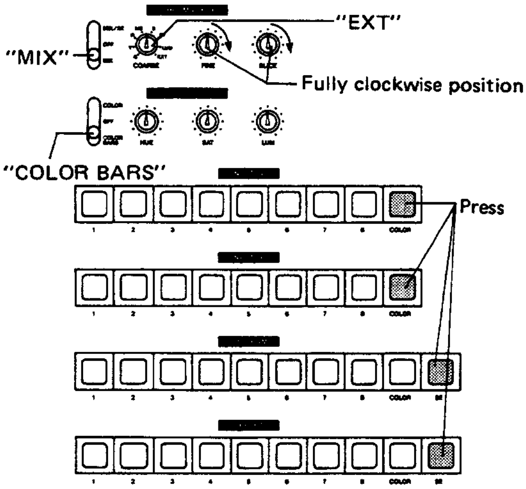
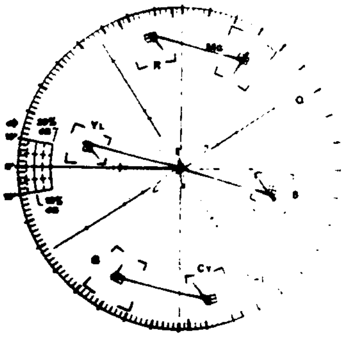

Color bars signal
1
2
3
4
"OFF"
75Ω
COMPOSITE VIDEO OUT
PGM1
PGM2
PGM3
PVW
Oscilloscope
1 ch
2 ch
75-ohm terminator
75-ohm terminator

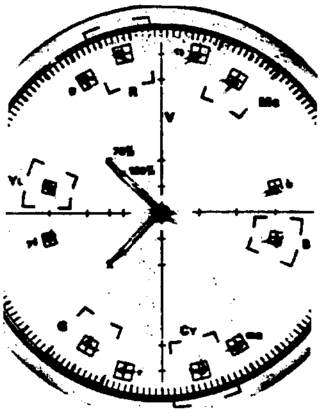
1	PGM output signal level	Oscilloscope (10 : 1, H-rate) or WFM	◎ PGM-1 OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) ⌽ B.B. GAIN (R302) [VIDEO - 1C] • **NTSC version** ☆ Burst level: 0.286 Vp-p • **PAL version** ☆ Burst level: 0.3 Vp-p ⌽ PGM GAIN (R299) [VIDEO - 1C] ☆ Same Y signal levels ⌽ VIDEO PED (R315) [VIDEO - 2A] ☆ Same pedestal levels	 Press PROGRAM BUS 1 2 3 4 5 6 7 8 COLOR BB 1) Connect the oscilloscope's CH-2 probe to the PGM-1 OUTPUT terminal (with 75-ohm terminator), and adjust R302 to obtain the specified burst level for the CH-2 signal.  ΔV2 284mV Burst level 100mV 10μs 2) Adjust the VRs to equalize levels of CH-1 and CH-2 signals. • This adjustment should be repeated several times. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure

2.8 CHROMA PHASE ADJUSTMENT

Note:
- For the following procedure, refer to "Adjustment parts location of BC board" on page 2-8 and "Adjustment parts location of CP board" on page 2-4.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.
- This adjustment needs a vectorscope. If it is unavailable, do not perform this adjustment.

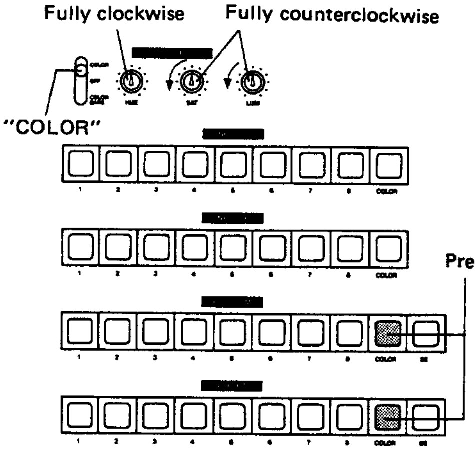
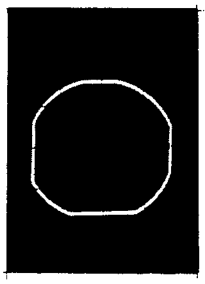
1	Phase of Bus A	Vectorscope	● Connect the extension board to the BC board. ● CP board need not be extended since VRs on the CP board can be adjusted from the front side.	● Setting on the control panel  "EXT" "MIX" Fully clockwise position "COLOR BARS" Press
			⏀ PGM-2 PHASE (R155) [CP - 2C] ☆ Mechanical center position	1) Set the MIX/SE lever to "A" bus side while the MIX lever to utmost position. 2) Set the PGM-2 PHASE control to its mechanical center position. 3) Set the vectorscope's GAIN control to "CAL" or "75%" (preset) position.
			⏀ B.B. PHASE (R101) [BC - 2B] ☆ Adjust color phase. **CAUTION** Turning B.B PHASE (R101) causes changing level of B.B 1 output level. After turning it, confirm the B.B level described in the section 2.7.4, and adjust the level if required. For adjustments after this, do not use the extension board. Make sure to remove it for correct adjustments.	4) Adjust VRs so that all spots (R, G, B, Mg, Cy, YL) of the signal are positioned at the points (in ⊞) on the vectorscope respectively.  – NTSC –

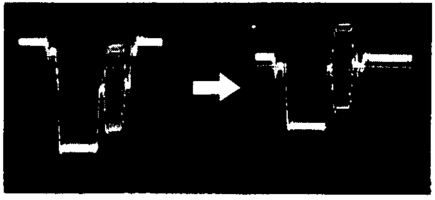
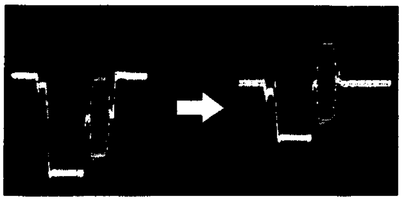
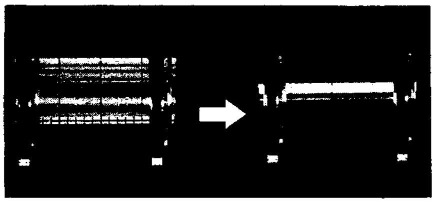
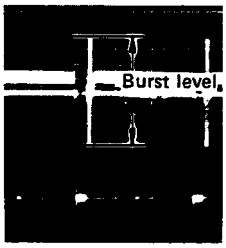
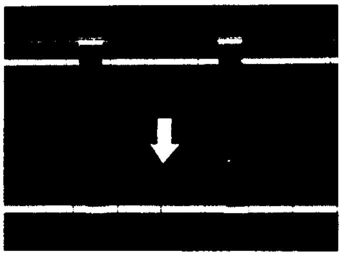
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⌽) Adjustment level (☆)	Adjustment procedure
			⌽ PGM-2 PHASE (R155) [CP - 2C] ☆ Adjust color phase.	 – PAL – 5) Disconnect the extension board from the BC board and return it as it was. 6) Adjust to correct the color phase in the same manner as step 4).
2	Phase of Bus B	Vectorscope	⌽ B PHASE (R141) [CP - 2C] ☆ Same color phase (between "BUS A" and "BUS B")	1) Switching the MIX/SE lever between two positions of "BUS A" and "BUS B" repeatedly, adjust the VR so that the color phase does not vary at any setting position of the lever.
3	Phase of PROGRAM Bus		⌽ PGM-1 PHASE (R142) [CP - 2C] ☆ Same color phase (between "BUS A" and "PROGRAM BUS")	1) Set the MIX/SE lever to "BUS A" side. 2) Alternately pressing the "COLOR" and "SE" of the PROGRAM BUS select button, adjust the VR so that the color phase is the same in the two modes.
4	Phase of PRESET Bus		⌽ PST-2 PHASE (R161) [CP - 2C] ☆ Same color phase (between "PROGRAM BUS" and "PRESET BUS") ⌽ PST-1 PHASE (R143) [CP - 2C] ☆ Same color phase (between "BUS A" and "PRESET BUS")	1) Select "SE" by pressing the PROGRAM BUS select button. 2) Switching the MIX lever between utmost and bottommost position repeatedly, adjust the VR so that the color phase does not vary in these conditions. 3) Set the MIX lever to bottommost position. 4) Alternately pressing the "COLOR" and "SE" of the PRESET BUS select button, adjust the VR to obtain the same color phase in the two modes.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure

2.9-N ADJUSTMENT OF BACK COLORS (NTSC version)

Note:
- For the following procedure, refer to "Adjustment parts location of BC board" on page 2-8.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.

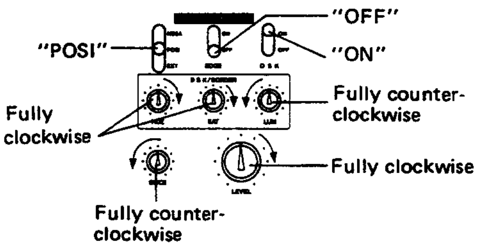
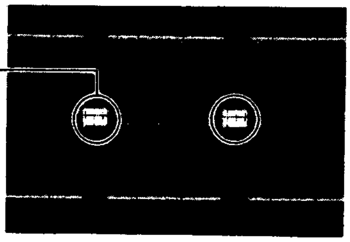
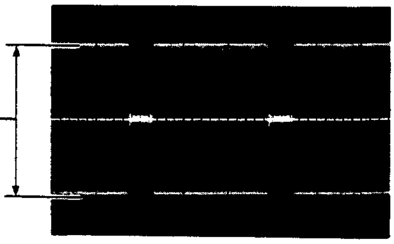
1	Oscillator	Oscilloscope (10 : 1, X-Y mode)	● Extend the BC board with the extension board. ◎ TP3 [BC - 1B] → ◎ TP4 [BC - 1B] → ⏀ OSC LEV (R128) [BC - 1B] ☆ Max. circle	● **Setting on the control panel** MIX/SE lever : Upper side MIX lever : Upper side  Fully clockwise Fully counterclockwise "COLOR" Press 1) Connect the oscilloscope as indicated below, and set it for observation in X-Y mode. → CH1 → CH2 2) Adjust the VR so that the pattern on the oscilloscope becomes a maximum circle. (Distortion like figure below is allowable.) 
2	Variable range of HUE level	Digital voltmeter	◎ IC34 pin 1 [BC - 1B] ⏀ BC HUE GAIN (R148) [BC - 1A] ☆ 2.75 V DC	1) Adjust for the specified level. ● If a vectorscope is available, select "COLOR" with the PROGRAM BUS select button and turn the HUE control from the full counterclockwise position to the full clockwise position to confirm that the color phase varies in the range of 370° (or over) and 420° (or under). (at the PGM-1 output) For checkup in this manner, set the LUM and SAT controls to the mechanical center position respectively. (It protect raster burn on the monitor.)

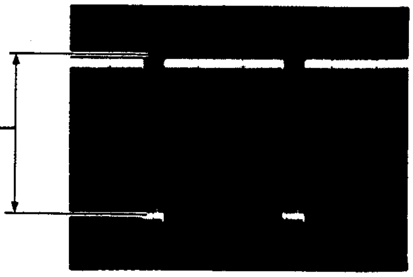
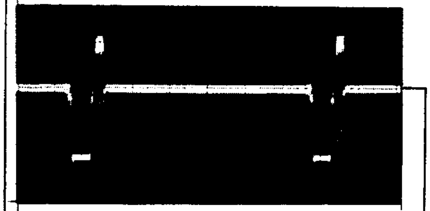
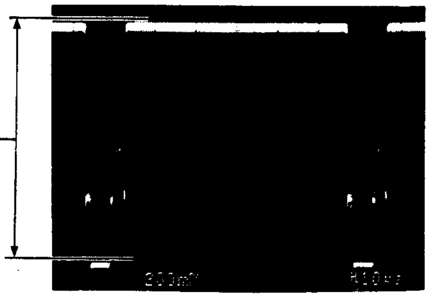
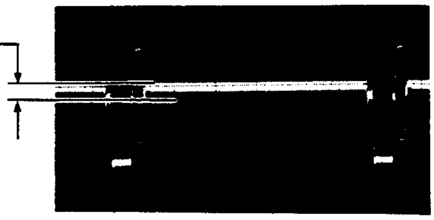
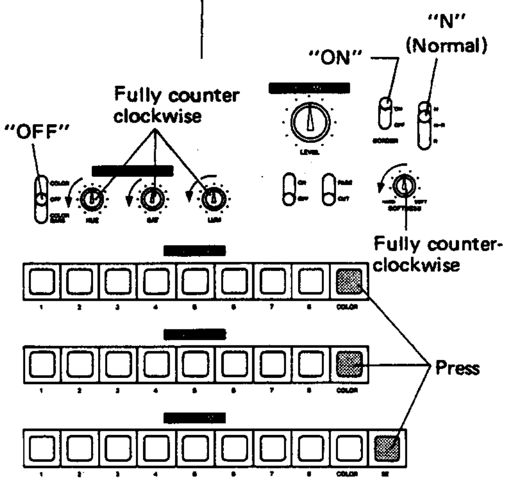
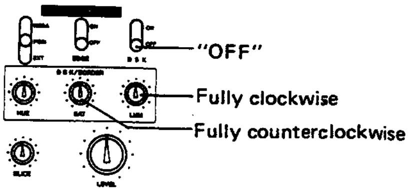
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⌽) Adjustment level (☆)	Adjustment procedure
3	DC balance	Oscilloscope (10 : 1, H-rate)	◎ TP6 [BC - 2A] ⌽ DC BAL (R194) [BC - 2A] ☆ Center of burst signal coincides with blanking level.  — NTSC version —	1) Adjust the center of burst signal for the blanking level so that they coincide with each other.  — PAL version —
4	Variable range of saturation		◎ TP6 [BC - 2A] ⌽ BC SAT DC (R319) [BC - 2C] ☆ Minimum chroma level	1) Minimize chroma level with R319. 
5	Output level of back color signal		◎ PVW OUTPUT (75 Ω terminated) ⌽ BC GAIN (R240) [BC - 2A] ● **NTSC version** ☆ Burst level: 0.286 Vp-p ● **PAL version** ☆ Burst level: 0.3 Vp-p	1) Adjust burst level for the specified value. 
6	Variable range of LUM		◎ Q55-B [BC - 1A] ⌽ BC LUM DC (R327) [BC - 1C] ☆ Flat waveform	1) Flatten the waveform with the VR. 
7	Phase of back color signal This item is available for NTSC version. For PAL version, refer to the page 2-15-P.	Vectorscope or Program monitor Preview monitor	◎ PGM OUTPUT → ⌽ PVW OUTPUT → ☆ BC PHASE (R196) [BC - 2B]	1) Set the SAT and LUM controls to their mechanical centers respectively. 2) Connect the vectorscope as indicated below. → Channel A (with 75-ohm terminator) → Channel B (with 75-ohm terminator) 3) Switching the channel of the vectorscope from A to B and from B to A repeatedly, adjust the VR to obtain the same color phase for the both. 4) Perform item 5. again. **Note:** If a vectorscope is unavailable and a program monitor and a preview monitor are used for this adjustment, coincide the color phases on the two monitors with each other.

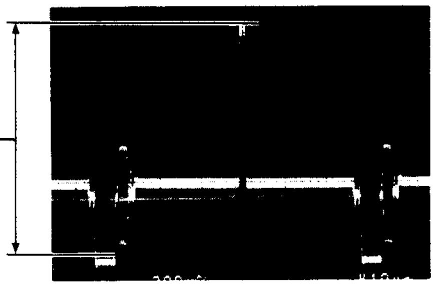
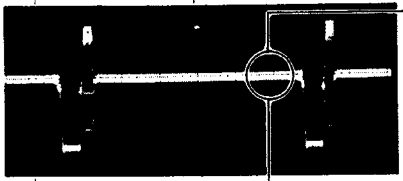
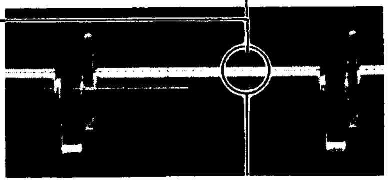
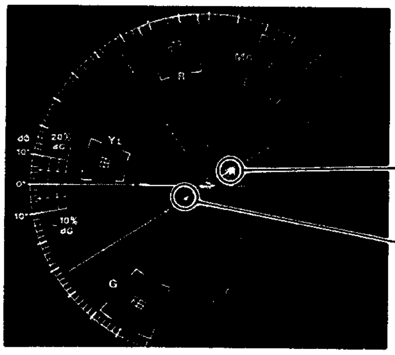
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

2.10-N DSK/BORDER COLOR ADJUSTMENT (NTSC version)

Note:
- For the following procedure, refer to "Adjustment parts location of BC board" on page 2-8.
- Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.
- For this adjustment, it is the first condition that the adjustments of Section 2.9 have been completed.

1	Variable range of Hue	Digital voltmeter	• Connect the extension board to BC board. ◎ IC25 pin 7 [BC - 1B] Ⓣ DSK HUE GAIN (R63) [BC - 1B] ☆ 2.75 V DC	● **Setting on the control panel**  "OFF" "POSI" "ON" Fully clockwise Fully counter-clockwise Fully clockwise Fully counter-clockwise 1) Adjust for the specified level. ● If a vectorscope is available, turn the HUE control from fully counterclockwise position to fully clockwise position to confirm that color phase varies between 370° (or over) and 420° (or under) on the vectorscope. (at the PGM-1 output) For checkup in this manner, set the LUM and SAT control to the mechanical center position respectively.
2	Carrier balance	Oscilloscope (10 : 1, H-rate)	◎ IC30 pin 7 [BC - 2B] Ⓣ C BAL (R89) [BC - 2B] Ⓣ C BAL (R90) [BC - 2B] ☆ Minimum carrier leak	1) Turn the VRs alternately to minimize carrier leak in the blanking period. 
3	Variable range of Saturation		◎ IC30 pin 7 [BC - 2B] Ⓣ BSK SAT DC (R335) [BC - 2C] ☆ 0.7 Vp-p	1) Adjust chroma level as specified.  2) Turn the SAT control fully counterclockwise and confirm that the chroma level is minimized. If it is not the minimum, turn the VR a little to minimize it. **Note:** When the VR is turned considerably big, repeat the above steps 1) and 2).

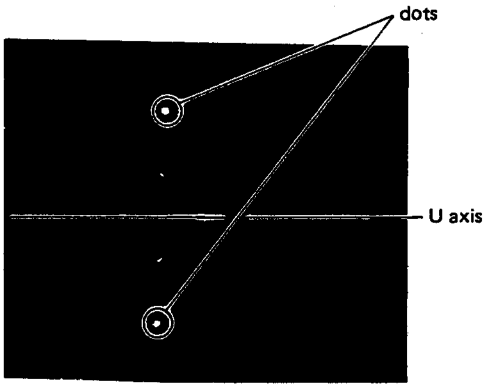
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure
4	Variable range of LUM	Oscilloscope (10 : 1, H-rate)	◎ CN4 pin 30 [BC - 1A] ⏀ DSK LUM DC (R343) [BC - 2C] ☆ 0.7 Vp-p	1) Turn the SAT control fully counterclockwise and the LUM control fully clockwise. 2) Adjust the blanking level as specified. 
5	DSK color level	 – PAL version –	• Leave the BC board as it is connected with the extension board. Adjustment on the VIDEO board can be performed from the above. ◎ PGM OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) ⏀ DSK COLOR GAIN (R205) [VIDEO - 1B] ☆ 1 Vp-p • **NTSC version** ⏀ DSK PED (R153) [VIDEO - 2A] ☆ Adjust for SETUP level. • **PAL version** ⏀ DSK PED (R153) [VIDEO-2A] ☆ Adjust for pedestal level	1) Adjust DSK color level as specified.  2) Turn the LUM control fully counterclockwise. 3) Adjust DSK color level for the specified level.  – NTSC version – 4) Repeat the steps 1) and 2).
6	Border color level	 "OFF" Fully counter clockwise "ON" "N" (Normal) Fully counter-clockwise Press		• **Setting on the control panel**  "OFF" Fully clockwise Fully counterclockwise 1) Select ◨ pattern with the WIPE PATTERN button and move the MIX/SE lever so that the border apear to center on the screen.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
6		Oscilloscope (10 : 1, H-rate)	◎ PGM OUTPUT [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ BORDER GAIN (R88) [VIDEO - 2A] ☆ 1 Vp-p	2) Adjust level of the border color as specified. 
		 – PAL version –	Ⓣ BORDER PED (R323) [VIDEO - 2A] • **NTSC version** ☆ Equal to SETUP level • **PAL version** ☆ Equal to pedestal level	3) Turn the LUM control of the DSK section fully counterclockwise. 4) Adjust the border color's level for the specified level.  – NTSC version –
			Ⓣ ERR CANCEL (R72) [VIDEO - 2A] ☆ Minimize serration.	5) Smooth the waveform with little serration.
7	Phase of DSK color and border color This item is available for NTSC version. For PAL version, refer to the page 2-18-P.	Vectorscope	Ⓣ BORDER C PHASE (R14) [VIDEO - 1C] ☆ Color phase difference: 180°	1) Select ▭ pattern with the WIPE PATTERN button. 2) Set the LUM control of the DSK to the center position and the SAT control to the fully clockwise position respectively, and turn the DSK switch "ON". 3) Observing the program monitor, turn the DSK LEVEL control to mix DSK color and border color. 4) Adjust the color phase difference between the DSK color and border color to be 180°.  DSK color BORDER color

- For proceeding to adjust this item, it is the first condition that the adjustments of Section 2.8 "Chroma phase adjustment" have been completed.
- If a vectorscope is unavailable, do not perform this adjustment.

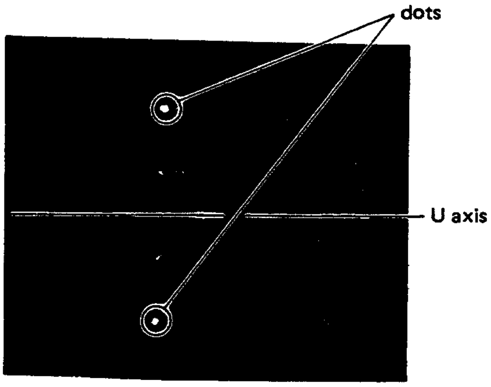
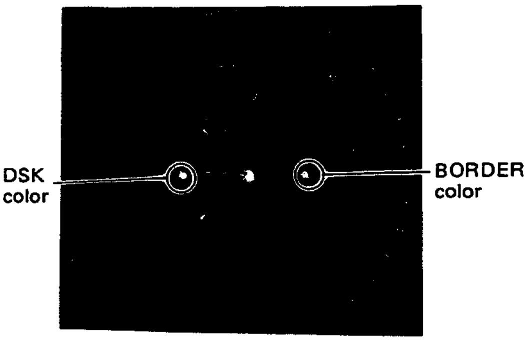
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

2.9-PADJUSTMENT OF BACK COLORS (PAL version)

For items 1 to 6, refer to the pages 2-14-N and 2-15-N.				
7	Phass of back color signal	Vectorscope	◎ PGM 1 output [Rear panel of Main unit] (with 75-ohm terminator) Ⓣ BC PHASE (R196) [BC - 2B] ☆ Overlap the dot on the U axis.	1) Turn the HVE control of "COLOR" section so that two dots overlap each other. 2) Adjusr the overlapped dot to come on the U axis of vectorscope. 

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⏀) Adjustment level (☆)	Adjustment procedure

2.10-P DSK/BORDER COLOR ADJUSTMENT (PAL version)

For items 1 to 6, refer to the page 2-16-N to 2.18-N.				
7	Phase of DSK color and border color	Vectorscope	⏀ DSK PHASE (R384) [BC - DS board] ☆ Overlap the dot on the U axis.	1) Select ▃ pattern with the WIPE PATTERN button. 2) Set the LUM control of the DSK to the center position and the SAT control to the fully clockwise position respectively, and turn the DSK switch "ON". 3) Turn the HVE control of "COLOR" section so that two dots overlap each other. 4) Adjust the overlapped dot to come on the U axis of vectorscope. 
• For proceeding to adjust this item, it is the first condition that the adjustments of Section 2.8 "Chroma phase adjustment" have been completed. • If a vectorscope is unavailable, do not perform this adjustment.				
			⏀ BORDER C PHASE (R14) [VIDEO - 1C] ☆ Color phase difference: 180°	5) Observing the program monitor, turn the DSK LEVEL control to mix DSK color and border color. 6) Adjust the color phase difference between the DSK color and border color to be 180°. 

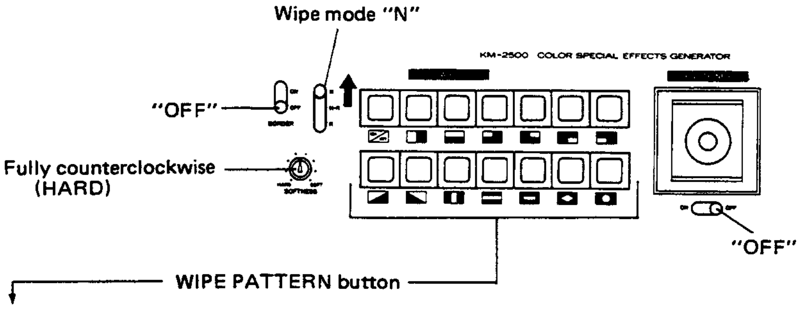
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure

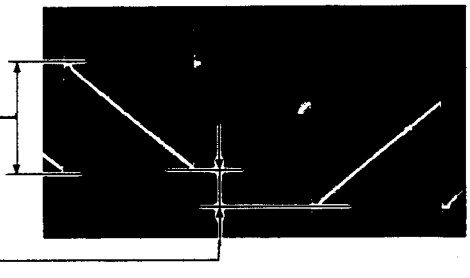
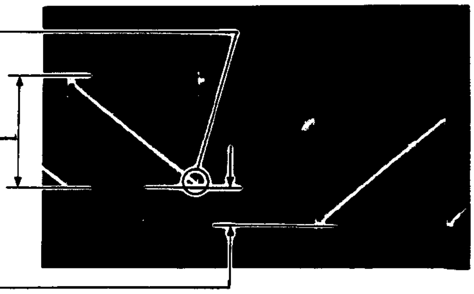
2.11 ADJUSTMENT OF WIPE PATTERN WAVEFORMS

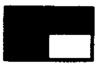
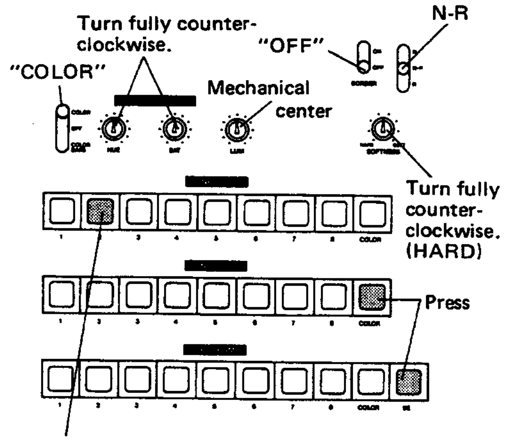
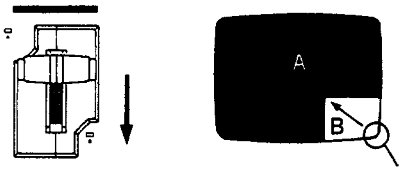
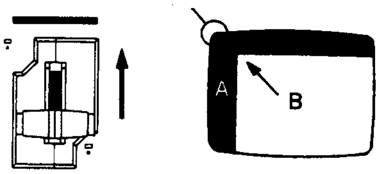
Note: For the following procedure, refer to "Adjustment parts location of WF board" on page 2-6.
Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.

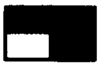
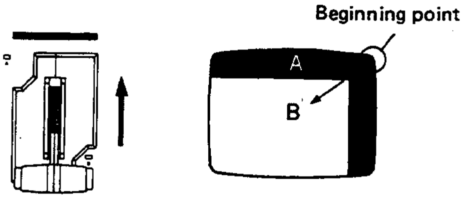
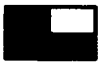
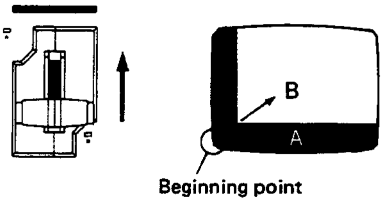
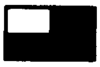
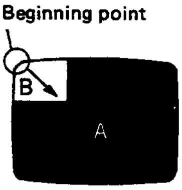
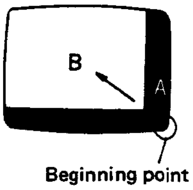
2.11.1 Sawtooth waveform and triangular waveform

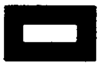
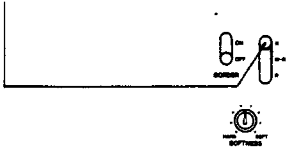
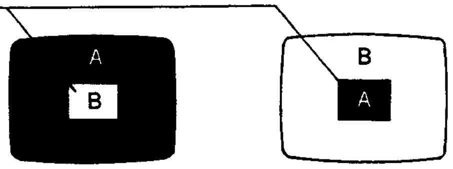
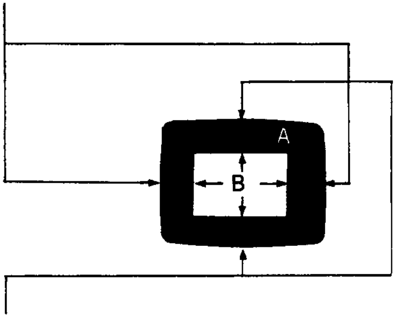
- For adjustment of each item, select the wipe pattern indicated in the column of "Measuring instruments & Input signals" with the WIPE PATTERN button.



1	Level of H. sawtooth waveform	◨ Oscilloscope (10 : 1, H-rate DC range)	● Extend the WF board with the extension board. ◎ TP1 [WF - 2A] ⦶ H. SAW GAIN (R155) [WF - 1A] ☆ 2.5 Vp-p ⦶ H. INV DC (R171) [WF - 1A] ☆ Equalize DC level of the waveforms of side A and side B.	1) Set the MIX/SE lever to the utmost of side A. 2) Adjust the peak level of the waveform as specified.  3) Change the set position of the MIX/SE lever from the utmost of side A to the utmost side of B, and confirm that the waveform is inverted at this time. Then, equalize DC levels of the two waveforms.
2	Level of V. sawtooth waveform	⬓ Oscilloscope (10 : 1, H-rate DC range)	◎ TP2 [WF - 2A] ⦶ V. TOP LEV (R405) ☆ DC level: 0 V ⦶ V. SAW GAIN (R228) [WF - 1A] ☆ Peak level: 2.5 Vp-p ⦶ V. INV GAIN (R243) [WF - 1B] ☆ Equalize DC level of the waveforms of side A and side B.	1) Set the MIX/SE lever to the utmost of side B. 2) Adjust the DC level as specified.  3) Change the set position of the MIX/SE lever from the utmost of side B to the utmost of side A, and confirm that the waveform is inverted at this time. Then, equalize DC levels of the two waveforms.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
3	Corner wipe (1)			● **Setting on the control panel**  Turn fully counter-clockwise. "COLOR" "OFF" N-R Mechanical center Turn fully counter-clockwise. (HARD) Press Press. (It is unnecessary to supply signal to "INPUT 2" of the rear panel of main unit. Perform adjustments without input signal.)
			◎ Program monitor Ⓣ H. SAW GAIN (R155) [WF - 2A] ☆ Coincide the beginning of H. wipe and V. wipe with each other.	1) Move the MIX/SE lever from side A to side B to observe the beginning of wipe on the program monitor. 2) Adjust the beginning of H. wipe and V. wipe so that they start at the same point and at the same time.  Beginning point
			Ⓣ V. TOP LEV (R405) ☆ Coincide the beginning of H. wipe and V. wipe with each other.	3) Move the MIX/SE lever from side B to side A and observe the beginning of wipe. 4) Adjust the beginning of H. wipe and V. wipe so that they start at the same point and at the same time. Beginning point 
				5) Repeat the steps 1) through 4) several times.

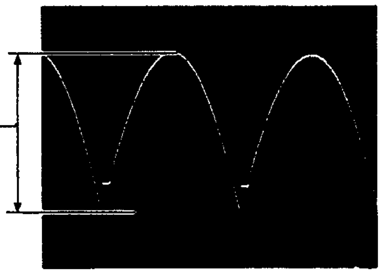
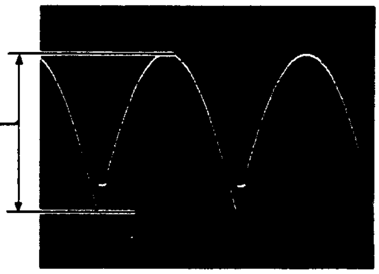
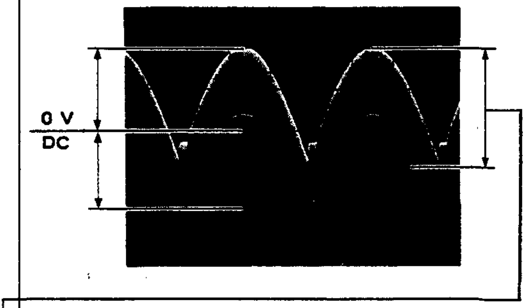
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
4	Corner wipe (2)		◎ Program monitor Ⓣ H. INV DC (R171) [WF - 1A] ☆ Coincide the beginning of H. wipe and V. wipe with each other.	1) Move the MIX/SE lever from side B to side A and observe the beginning of wipe. 2) Adjust the beginning of H. wipe and V. wipe so that they start at the same point and at the same time. 
5	Corner wipe (3)		◎ Program monitor Ⓣ V. INV DC (R243) [WF - 1B] ☆ Coincide the beginning of H. wipe and V. wipe with each other.	1) Move the MIX/SE lever from side B to side A and observe the beginning of wipe. 2) Adjust the beginning of H. wipe and V. wipe so that they start at the same point and at the same time. 
6	Corner wipe confirmation		◎ Program monitor	1) Move the MIX/SE lever between side A and side B repeatedly, and confirm that H. wipe and V. wipe start at the same point and at the same time. 2) If they differ extremely from each other (10% or more difference between two sides), perform the adjustments of item 3 through 5 again.  Lever: from A to B  Lever: from B to A

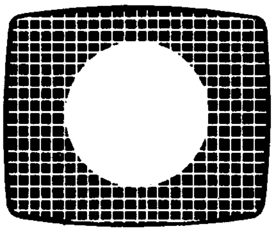
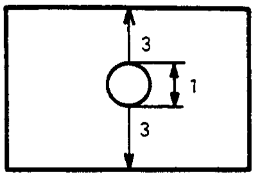
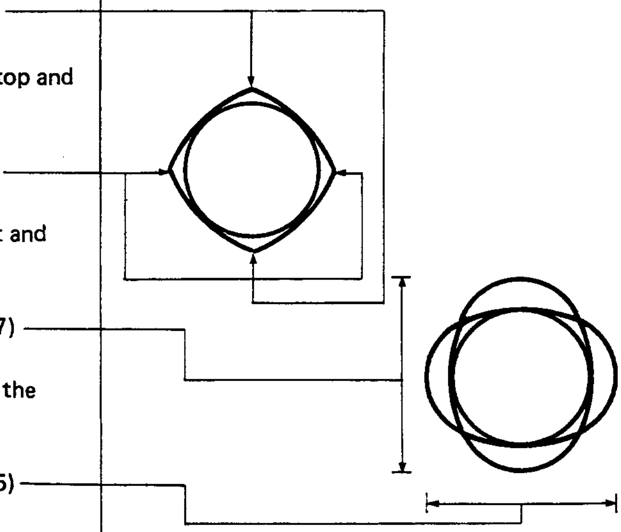
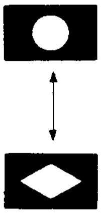
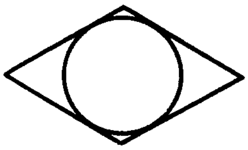
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (ⓣ) Adjustment level (☆)	Adjustment procedure
7	Window wipe			1) Set the WIPE mode to "N" (Normal). 
			◎ Program monitor	2) Observe the pattern on the program monitor at the time when the MIX/SE lever is just moved from side A to side B and vice versa.
			ⓣ H. TOP LEVEL (R404) [WF - 1A] ☆ Nearly the same aspect ratio in both directions	3) Adjust the VR so that aspect ratio of wipe pattern in the two directions becomes nearly the same.  Lever: from A to B Lever: from B to A **Note:** If the wipe pattern is not positioned in the center of the screen, don't mind it because it will be adjusted after the next step.
			◎ Program monitor ⓣ H. TRI GAIN (R154) [WF - 1A] ☆ Same width on both sides	4) Move the MIX/SE lever from side A to side B and stop it just before the finish of wipe. 5) Adjust for the same width on the both sides. 
			ⓣ V. TRI GAIN (R227) [WF - 1A] ☆ Same width on top and bottom	6) Adjust for the same width on the top and the bottom. 7) Check the result of the step 3) again. If there is a big difference between the two in the aspect ratio, repeat the steps 3) through 6) to obtain satisfactory results respectively.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

2.11.2 Adjustment of parabolic waveform

- This adjustment must be performed in succession to the adjustment of Section 2.11.1.

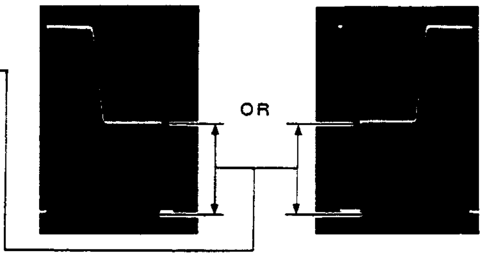
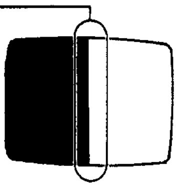
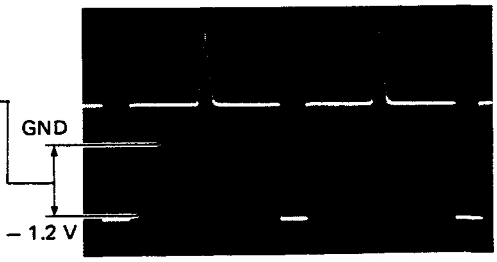
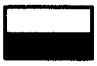
1	Level of H. parabolic waveform	 Oscilloscope (10 : 1, H-rate)	● Confirm that the WIPE mode is set to "N" (normal). ◎ H. PARA ADJ (R165) [WF - 2A] Ⓣ Mechanical center ◎ IC24 pin 7 [WF - 2A] Ⓣ H. PARA GAIN (R167) [WF - 1A] ☆ 0.75 Vp-p	1) Set the MIX/SE lever to the utmost position on side A. 2) Set the H. PARA ADJ control to the mechanical center position. 3) Adjust the peak level of the waveform as specified. 
2	Level of V. parabolic waveform	Oscilloscope (10 : 1, V-rate)	Ⓣ V. PARA ADJ (R238) [WF - 2A] ☆ Mechanical center ◎ IC41 pin 7 [WF - 1B] Ⓣ V. PARA GAIN (R245) [WF - 1A] ☆ 0.4 Vp-p.	1) Set the V. PARA ADJ control to the mechanical center position. 2) Adjust the peak level of the waveform as specified. 
3	Level of H-V mixed waveform	Oscilloscope (10 : 1, H-rate DC range)	◎ TP3 [WF - 2A] Ⓣ PARA BIAS (R203) [WF - 2A] ☆ Center of waveform: 0 V DC Ⓣ F.B. GAIN (R190) [WF - 2A] Ⓣ F.B. BIAS (R193) [WF - 2A] Ⓣ CONE BIAS (R195) [WF - 2A] ☆ 2 Vp-p	1) Adjust the waveform so that its center coincides with the level of 0 V DC.  2) Set the F.B. GAIN and F.B. BIAS controls to the mechanical center position respectively. 3) Adjust amplitude of the upper half of the waveform for the specified level. 4) Repeat the steps 1) and 3) several times.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (⦶) Adjustment level (☆)	Adjustment procedure
4	Shape of round wipe		 ◎ Program monitor ⦶ H. PARA ADJ (R165) [WF - 2A] ☆ Round corners at the top and bottom. ⦶ V. PARA ADJ (R238) [WF - 2A] ☆ Round corners at right and left sides. ⦶ H. PARA GAIN (R167) [WF - 1A] ☆ Correct irregularity of the pattern. ⦶ V. PARA GAIN (R245) [WF - 1A] ☆ Correct irregularity of the pattern.	**Note:** It is recommended to use a cross hatch signal generator for more precise adjustment. When it is used, supply cross hatch signal to the INPUT 2 terminal and select "INPUT 2" with the BUS A button. (In this case, the image on a program monitor is as shown on the left.) If a cross hatch signal generator is unavailable, perform the adjustment by observing the program monitor by eyes. 1) Move the MIX/SE lever from side A to side B to make a round wipe on the monitor in the ratio shown below.  2) Adjust the VRs to make the wipe pattern completely round.  3) Magnify the wipe pattern on the screen and precisely adjust VRs to shape the pattern.
5	Size of round wipe		◎ Program monitor ● **Normal pattern** ⦶ PARA BIAS (R203) [WF - 2A] ☆ Adjust the size of two patterns for each other. ● **Reverse pattern** ⦶ PARA INV DC (R208) [WF - 2A] ☆ Adjust the sizes of two patterns for each other.	1) Move the MIX/SE lever from side A to side B to make the wipe pattern in the ratio indicated in the above item 4, step 1). 2) Change the wipe pattern from ◘ to ◈ or vice versa, and adjust their sizes as shown below.  3) Move the MIX/SE lever from side B tip to side A, and perform the same adjustments as the above steps 1) and 2).

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

2.11.3 Gate signal adjustment

- Perform this adjustment in succession to Section 2.11.2.

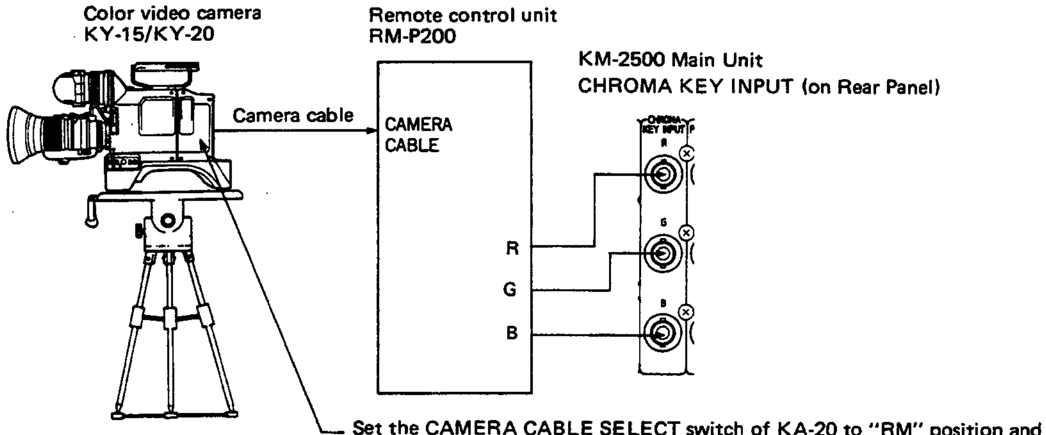
1	Blanking level	Oscilloscope (10 : 1, H-rate) (MIX/SE lever: Center position)	Ⓣ KEY GAIN (R318) [WF - 2B] ☆ Mechanical center position Ⓣ KEY DC (R358) [WF - 2B] ☆ Fully clockwise position ◎ CBM9 pin 1 [WF - 1B] Ⓣ BL DC (R298) [WF - 1C] ☆ Blanking level: 4 Vp-p	1) Set the KEY GAIN control to the mechanical center position and turn the KEY DC control fully clockwise. 2) Move the MIX/SE lever to set it to the center position first, and then adjust blanking level of gate signal. 
2	Softness in the center		◎ Program monitor Ⓣ WIPE KEY DC (R308) [WF - 2B] ☆ Stable images on the border	1) Turning the SOFTNESS control from "HARD" to "SOFT" position, adjust the VR so that there is no shake on the border of right and left images. 
3	Border width		◎ TP5 [WF - 2B] Ⓣ BORKER KEY DC (R313) [WF - 2B] ☆ Blanking level: –1.2 V DC to level of GND **Note:** Border line may possibly appear in the picture. This will be corrected in the next item.	1) Adjust DC level of the waveform. 
4	Balance of borders	(MIX/SE lever: Center position)  	◎ Program monitor Ⓣ H. BORDER W (R198) [WF - 2A] ☆ Stabilize the center of border. Ⓣ V. BORDER W (R275) [WF - 2B] ☆ Stabilize the center of border.	1) Set the BOARDER switch to "ON". 2) Set the SOFTNESS control to the mechanical center position. 3) Switching the BORDER switch ON/OFF, adjust R198 to stabilize the center of the border of right and left images. 4) In the same manner as in the step 3) above, adjust R275 to stabilize the center of the boarder of upper and lower images. 5) When border line appears even if the BORDER switch is set to "OFF", slightly turn BORDER KEY DC (R313) to erase it. (Do not turn the VR too much.)

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

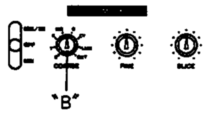
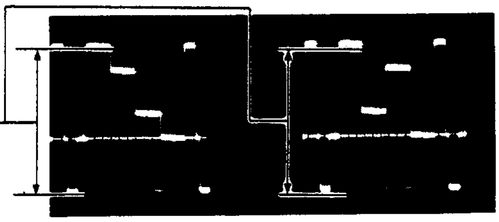
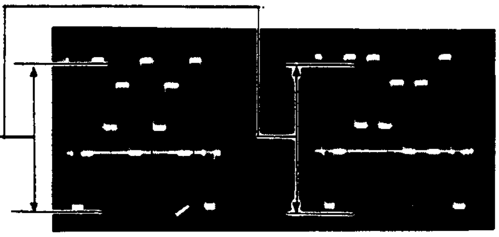
2.12 CHROMA KEY ADJUSTMENT

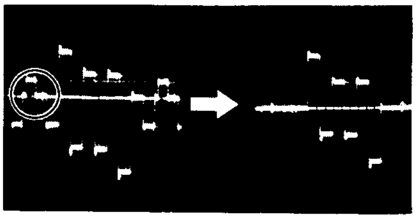
Note: • For the following procedure, refer to "Adjustment parts location of CP board" on page 2-4.
• Symbol (or word) and code in square brackets indicate the board name and the diagram's section where the adjustment part is located in.

- **Setup and connection for this adjustment**


Color video camera
KY-15/KY-20
Remote control unit
RM-P200
KM-2500 Main Unit
CHROMA KEY INPUT (on Rear Panel)
Camera cable
CAMERA
CABLE
R
G
B
CHROMA
KEY INPUT
R
G
B

Set the CAMERA CABLE SELECT switch of KA-20 to "RM" position and DIP switch (S1) "AUTO" of VP board of the KA-20 to "ON".

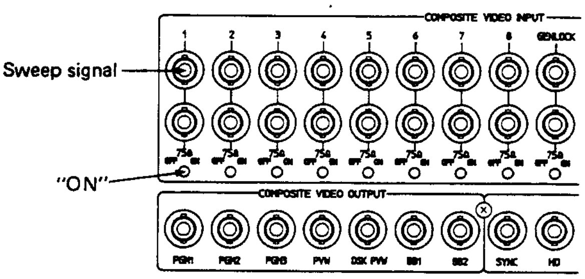
No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
1	Preparatory setup	Oscilloscope (10 : 1, H-rate)	Ⓣ Remote control unit R,G.B. output terminals ☆ 0.525 Vp-p (with 75-ohm terminator)	1) Set the MODE switch of the RM-P200 remote control unit to "BARS" position. 2) Confirm output levels at R, G, B terminals of the remote control unit respectively.
2	Gain balance		• Connect the extension board to the CP board.	• **Setting on the control panel**  1) Turn the FINE control fully clockwise and counterclockwise, and equalize signal levels of the two waveforms observed in the above conditions.
			◎ TP4 [CP - 2A] Ⓣ A GAIN BAL (R89) [CP - 2A] ☆ Same signal level	 FINE control set fully counterclockwise FINE control set fully clockwise
			◎ TP3 [CP - 2A] Ⓣ B GAIN BAL (R47) [CP - 2A] ☆ Same signal level	 FINE control set fully counterclockwise FINE control set fully clockwise

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure
3	White balance	Oscilloscope (10 : 1, H-rate)	◎ J1 Center pin [CP - 2A] Ⓣ WHITE BAL (R50) [CP - 2A] ☆ Adjust WHITE level to the blanking level.	1) Set the FINE control to the mechanical center position. 2) Adjust signal level of the white segment of the waveform to the blanking level. 
4	Key delay		Ⓣ KEY DELAY (R105) [CP - 2A] ☆ Mechanical center position	1) Set the KEY DELAY control to the mechanical center position.

No.	Item	Measuring instruments & Input signals	Measuring point (◎) Adjustment parts (Ⓣ) Adjustment level (☆)	Adjustment procedure

2.13 ADJUSTMENT OF FREQUENCY CHARACTERISTICS

- For this adjustment it is necessary to supply sweep signal.
- If no sweep signal generator is available, do not perform this.
- After completion of this adjustment, repeat the adjustments of Section 2.8 'Chroma Phase Adjustment'.


COMPOSITE VIDEO INPUT
1
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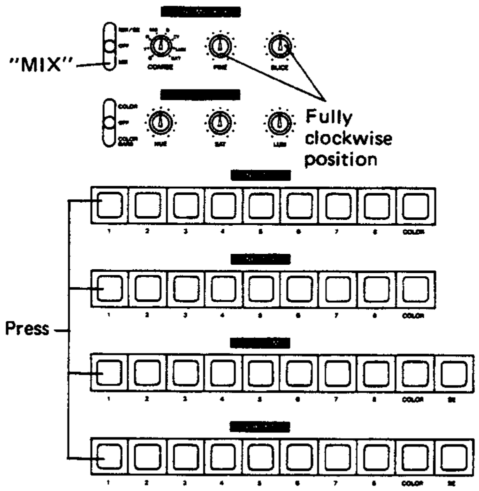
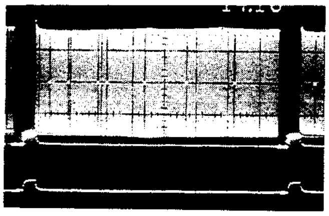
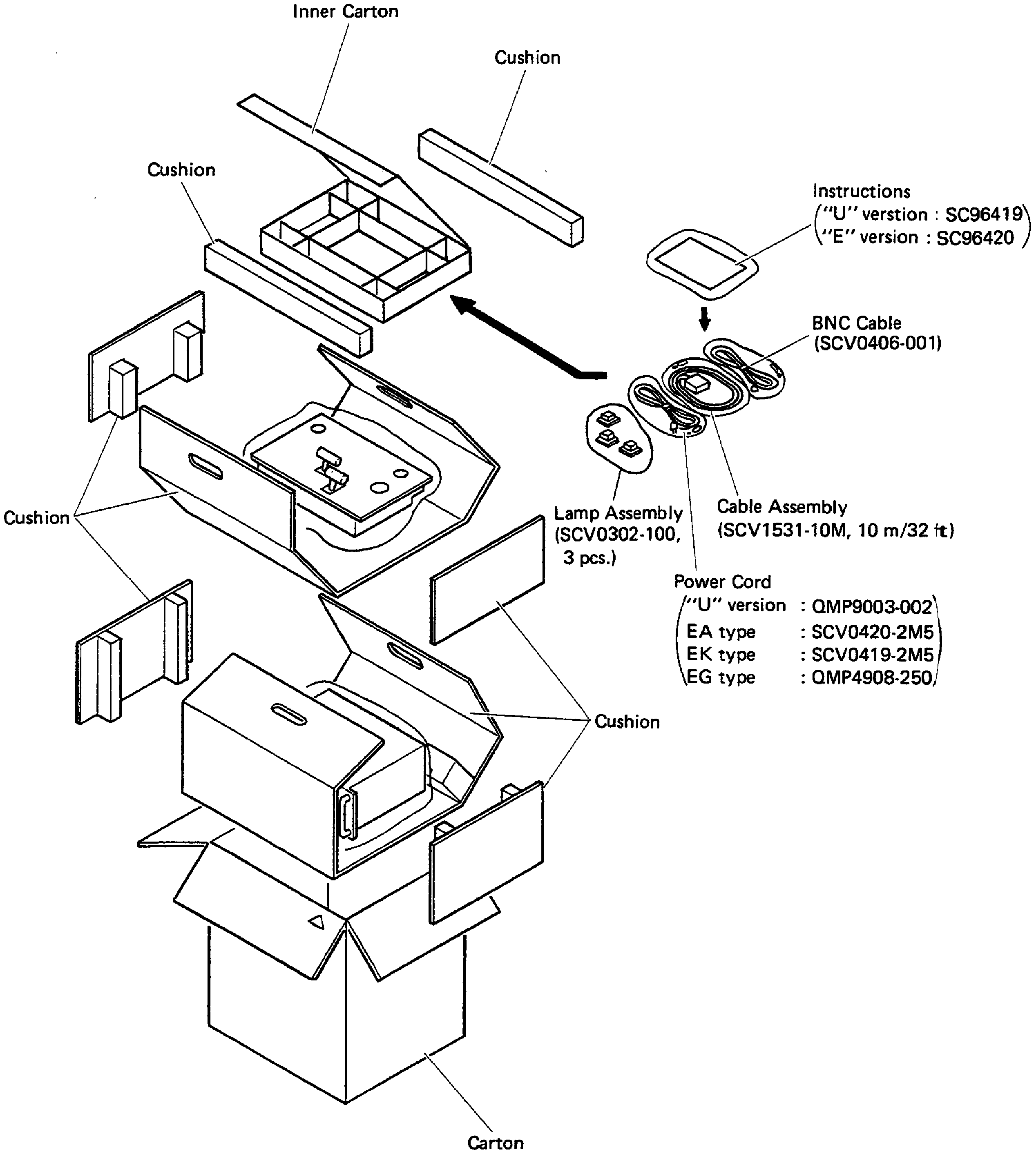
GENLOCK
Sweep signal
75Ω
OFF ON
"ON"
COMPOSITE VIDEO OUTPUT
PGM1
PGM2
PGM3
PVW
DSK PVW
BB1
BB2
SYNC
HD

1	Frequency characteristic	Sweep signal Oscilloscope (10 : 1, V-rate)	• Take off the top cover of the main unit to expose the VIDEO board. Do not use extension board.	• **Setting on the control panel**  "MIX" Fully clockwise position Press COLOR SE
	(BUS A)		Ⓣ TP3 [VIDEO - 1 A] ☆ C28 [VIDEO - 2A]	1) Move the MIX/SE lever to the side A. 2) Adjust C28 to make the signal level as flat as possible. 
	(BUS B)		Ⓣ C32 [VIDEO - 2A]	3) Move the MIX/SE lever to the side B. 4) Make the frequency characteristic possibly flat.
	(SE signal)		◎ TP6 [VIDEO - 2A] Ⓣ C54 [VIDEO - 2A]	5) Adjust the frequency characteristic to make it as flat as possible.
	(PROGRAM BUS)		◎ TP9 [VIDEO - 2B] Ⓣ C110 [VIDEO - 2B]	6) Set the MIX/SE lever to the side A while the MIX lever to "PROGRAM BUS" position. 7) Make the frequency characteristic possibly flat.
	(PRESET BUS)		Ⓣ C113 [VIDEO - 2B]	8) Set the MIX lever to "PRESET BUS" position. 9) Use C113 to make the frequency characteristic possibly flat.
		Note: The following trimmer capacitor should be set to the mechanical position, respectively. C57 [VIDEO - 2A], C182 [VIDEO - 1B], C185 [VIDEO - 1B], C170 [VIDEO - 1C], C171 [VIDEO - 1C]		

SECTION 3
REPACKING

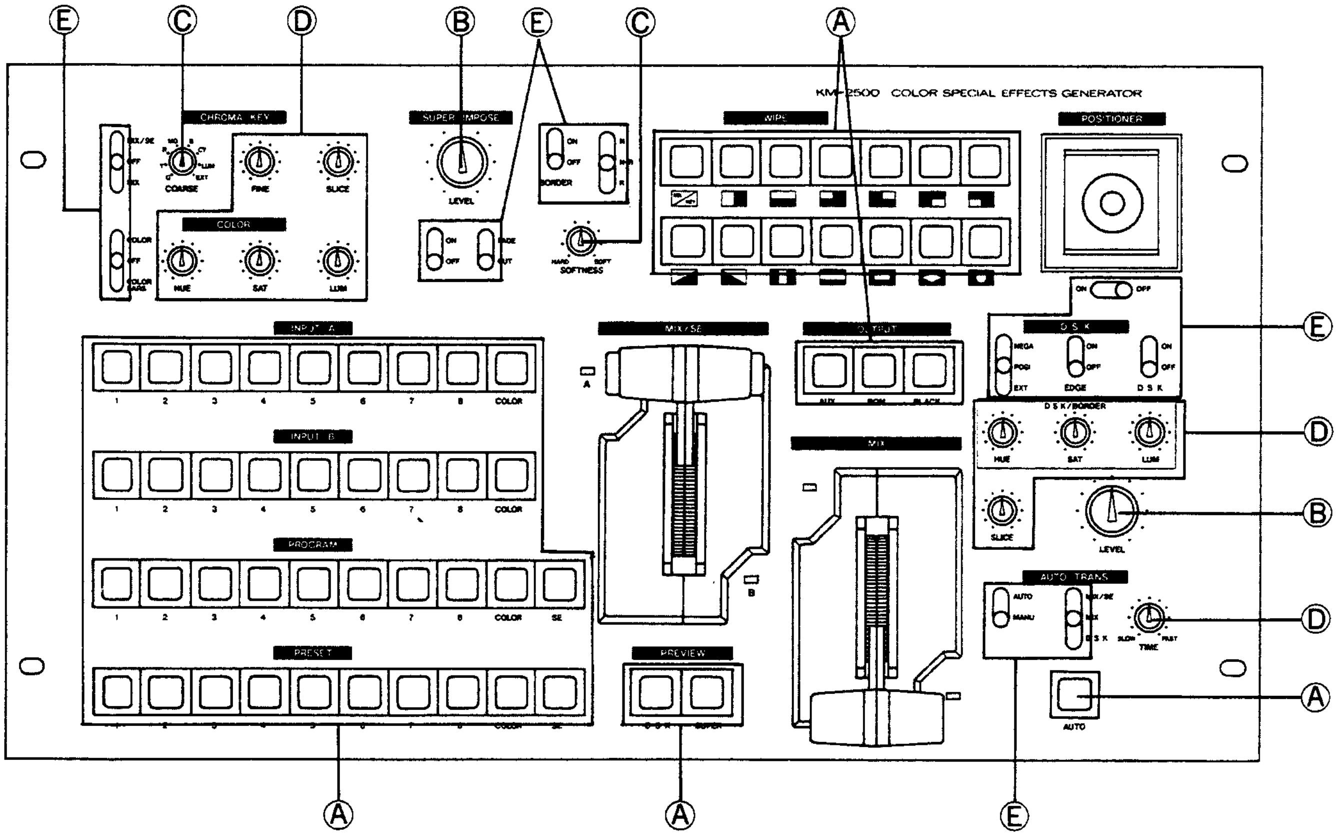

Inner Carton
Cushion
Cushion
Instructions
("U" verstion : SC96419
"E" version : SC96420)
BNC Cable
(SCV0406-001)
Cushion
Lamp Assembly
(SCV0302-100,
3 pcs.)
Cable Assembly
(SCV1531-10M, 10 m/32 ft)
Power Cord
("U" version : QMP9003-002
EA type : SCV0420-2M5
EK type : SCV0419-2M5
EG type : QMP4908-250)
Cushion
Carton

SECTION 4
EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

Parts identified by the symbol are critical for safety.
Replace only with specified part numbers.

4.1 BUTTON AND KNOB ASSEMBLIES OF CONTROL UNIT M1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KM-2500 COLOR SPECIAL EFFECTS GENERATOR
CHROMA KEY
COARSE
FINE
SLICE
COLOR
HUE
SAT
LUM
COLOR BARS
SUPER IMPOSE
LEVEL
ON
OFF
FADE
CUT
BORDER
HARD
SOFT
SOFTNESS
WIPE
POSITIONER
INPUT A
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7
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COLOR
INPUT B
PROGRAM
SE
PRESET
MIX/SE
A
B
OUTPUT
AUX
BLACK
MIX
PREVIEW
D S K
SUPER
D S K
MEGA
POSI
EXT
EDGE
D S K/BORDER
LEVEL
AUTO TRANS
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FAST
TIME
AUTO
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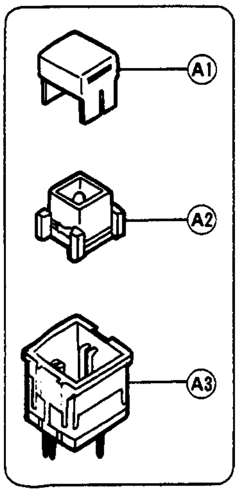

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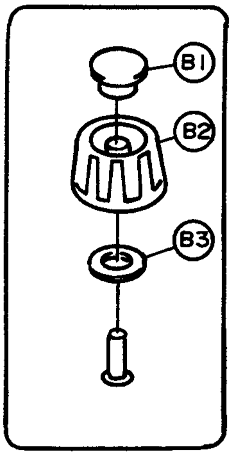

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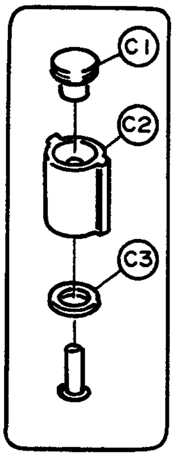

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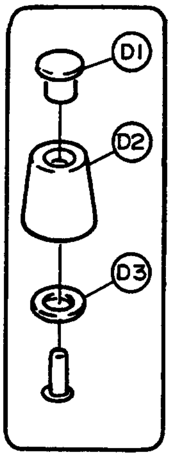

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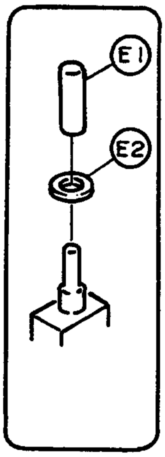


- **Button and knob assemblies parts list**

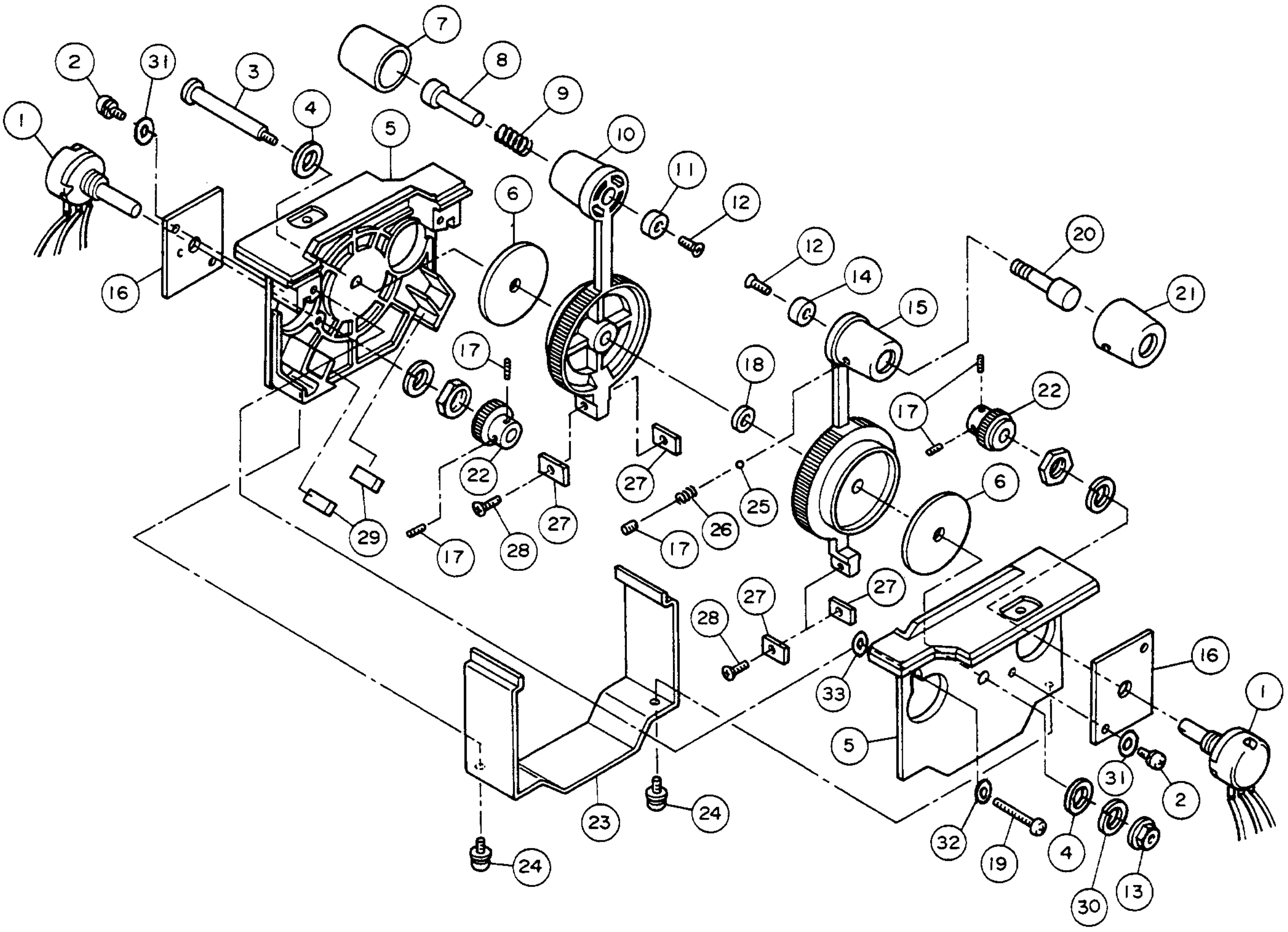
M1MM□□□□

Symbol No.		Part No.	Part Name	Description
A	A 1		Cap	SB board S1 – S57, S66
	A 2	SCV0302-100	Lamp Assembly	
	A 3	SCV1439	Push Switch	
B	B 1	SC40687-021	Knob Cap	
	B 2	SC40686-021	Knob	
	B 3	SC40724-002	Spacer	
C	C 1	SC40685-021	Knob Cap	
	C 2	SC40684-021	Knob	
	C 3	SC40724-001	Spacer	
D	D 1	SC40685-021	Knob Cap	
	D 2	SC40683-021	Knob	
	D 3	SC40724-001	Spacer	
E	E 1	SCV0295-001	Lever	
	E 2	SC40392-001	Spacer	

A1 parts No.
SCV0326-□□□

□□□	Color
100	White
120	Blue
130	Green
140	Orange
150	Yellow

4.2 MIX/SE LEVER ASSEMBLY M 2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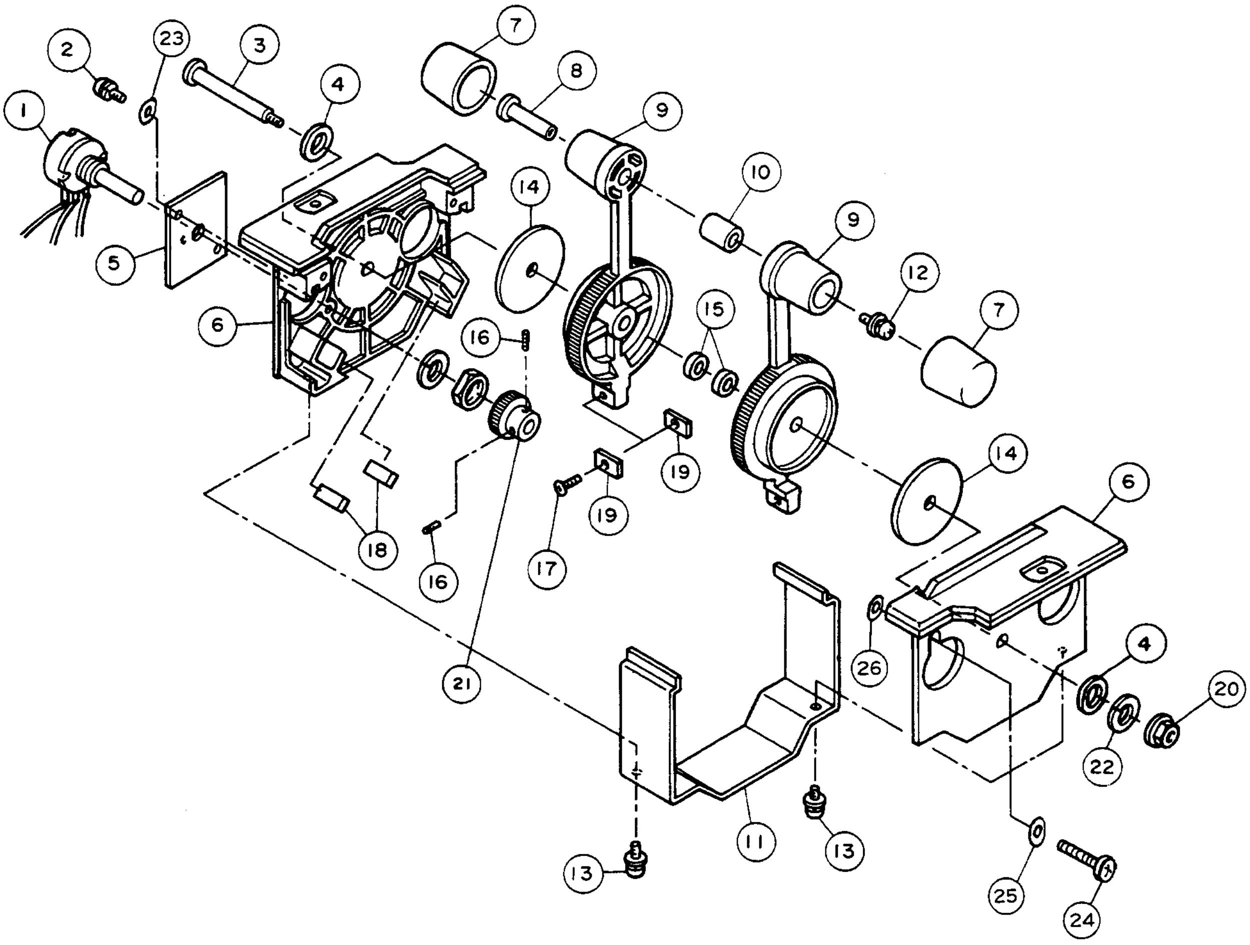
- **MIX/SE lever assembly parts list**

M2MM☐☐☐☐

Symbol No.	Part No.	Part Name	Description
1	SCV0289-001	V. Resistor	1 kΩ B (Washer and Nut included)
2	SPSP3006Z	Screw	M3 x 6
3	SC40708-001	Spindle	
4	WNS6000N	Washer	
5	SC20087-003	Case	
6	SC42419-001	F. Spacer	
7	SC40711-001	Knob-1	
8	SC40709-001	Button-1	
9	SC40718-001	Spring-2	
10	SC30321-001	Lever-1	
11	SC40715-001	Guide	
12	SSSP3008N	Screw	M3 x 8
13	NFZ5000Z	F. Nut	
14	SC40715-002	Guide	
15	SC30322-002	Lever-2	
16	SC40721-001	Bracket	
17	YFS3003F	Set Screw	
18	Q03093-837	Spacer	
19	SPSP3016N	Screw	
20	SC40710-001	Button-2	
21	SC40712-001	Knob-2	
22	SC40713-001	Gear	
23	SC30327-001	Cover	
24	LPSP3006Z	Screw	M3 x 6
25	SC40465-024	Steel Ball	
26	SC40717-001	Spring-1	
27	SC40720-001	M. Base	
28	SSSP2605N	Screw	M2.6 x 5
29	SC40725-001	M. Rubber	Glued to ⑤
30	WLS6000N	Washer	
31	WNS3000N	Washer	
32	WNS6000N	Washer	
33	Q03093-115	Washer	

4.3 MIX LEVER ASSEMBLY M3



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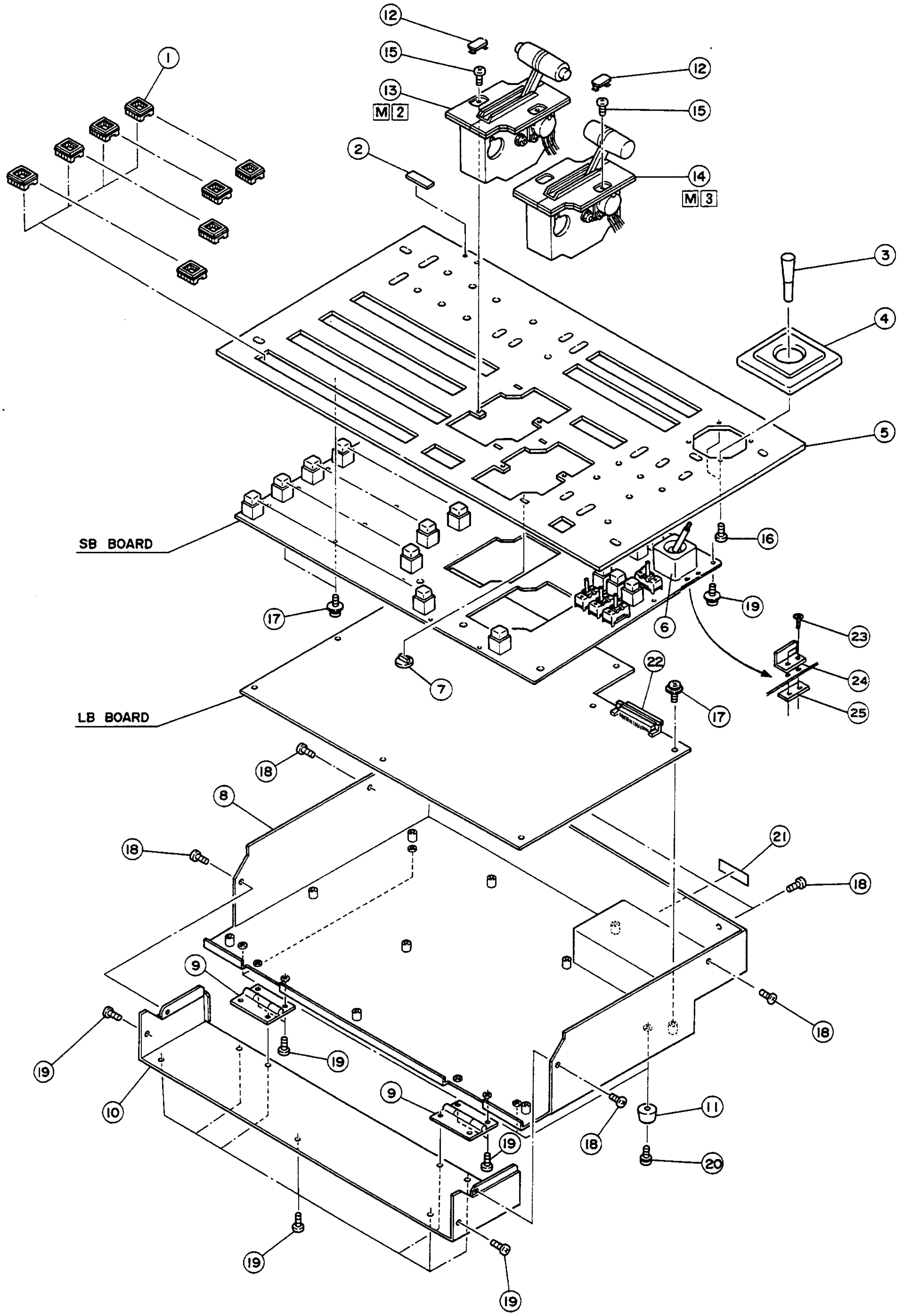
- **MIX lever assembly parts list**

M3MM☐☐☐☐

Symbol No.	Part No.	Part Name	Description
1	SCV0289-001	V. Resistor	1 kΩ B (Washer and Nut included)
2	SPSP3006Z	Screw	M3 x 6
3	SC40708-001	Spindle	
4	WNS6000N	Washer	
5	SC40721-001	Bracket	
6	SC20087-003	Case	
7	SC40711-002	Knob-1	Glued to ⑨
8	SC40727-001	Shaft	
9	SC30321-002	Lever-1	
10	SC40728-001	Sleeve	
11	SC30327-001	Cover	
12	DPSP3008Z	Screw	M3 x 8
13	LPSP3006Z	″	M3 x 6
14	SC42419-001	F. Spacer	
15	Q03093-837	Spacer	
16	YFS3003F	Set Screw	
17	SSSP2605N	Screw	M2.6 x 5
18	SC40725-001	M. Rubber	Glued to ⑥
19	SC40720-001	M. Base	
20	NFZ5000Z	F. Nut	
21	SC40713-001	Gear	
22	WLS6000N	Washer	
23	WNS3000N	Washer	
24	SPSP3016N	Screw	M3 x 16
25	WNS6000N	Washer	
26	Q03093-115	Washer	

4.4 CONTROL UNIT ASSEMBLY M 4


⑫
①
⑮
⑬
M 2
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⑮
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M 3
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⑤
SB BOARD
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⑦
⑰
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LB BOARD
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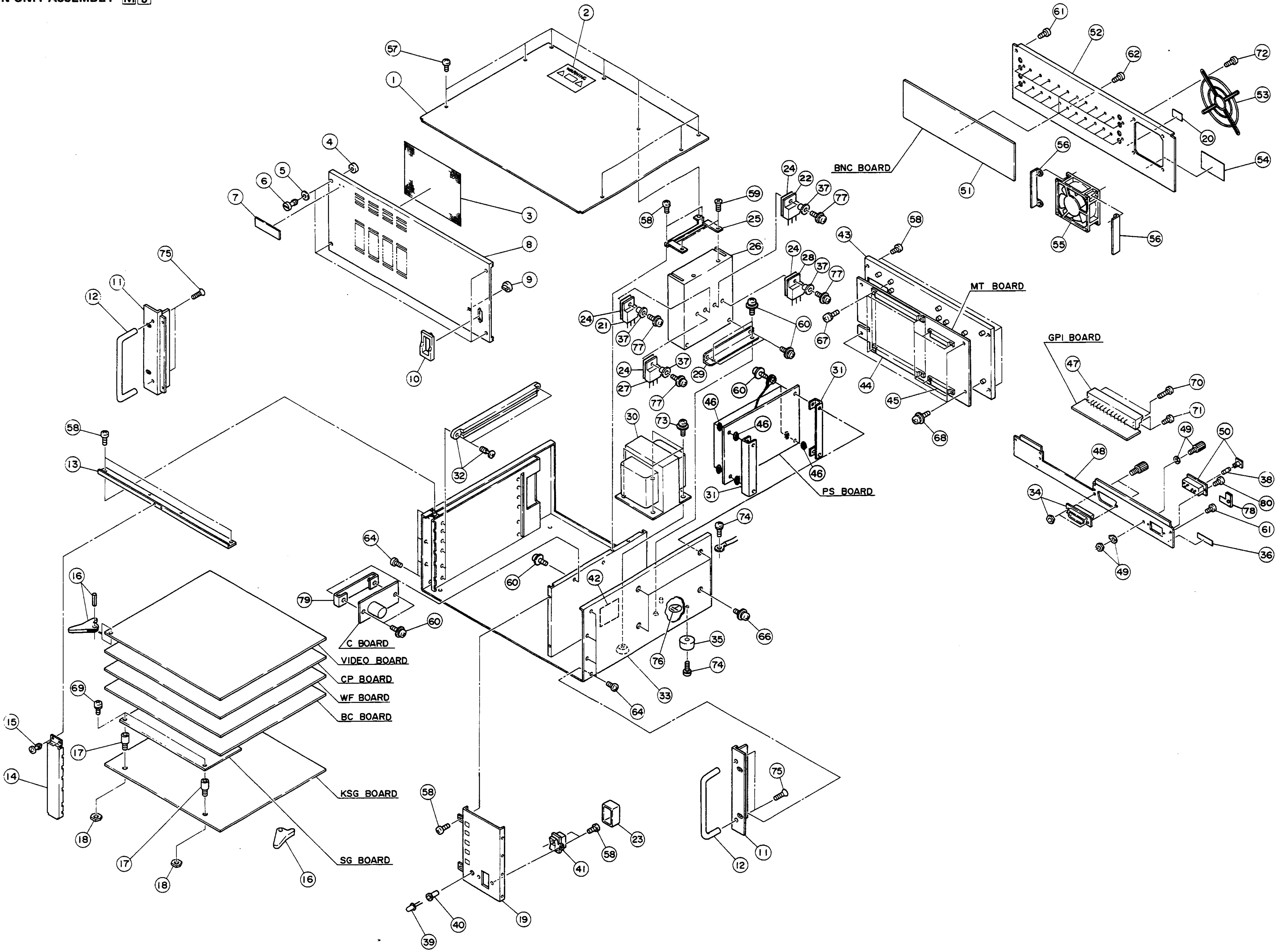
- **Control unit assembly parts list**

M4MM☐☐☐☐

Symbol No.	Part No.	Part Name	Descriqtion
1	SC40695-002	SW Escutcheon	
2	Not Available	JVC Logo Mark	
3	SC43675-001	Knob	
4	SC31159-001	Escutcheon	
5	SC10097-00A	Control Panel	
6	SCV0293-001	Joy Stick	POSITIONER
7	SM40303-002	LED Lens	
8	SC10096-00A	Bottom Case	
9	SC40913-002	Hinge	
10	SC20371-001	Front Cover	
11	E47227-006	Rubber Foot	
12	SC42028-002	Cap	
13	Refer to the Section 4.2	MIX/SE Lever Assembly	
14	Refer to the Section 4.3	MIX Lever Assembly	
15	SSSP4006N	Screw	M4 x 6
16	SBSB2606Z	Screw	M2.6 x 6
17	DPSP3006Z	Screw	M3 x 6
18	SDSP3006M	Screw	M3 x 6
19	SDSP3006R	Screw	M3 x 6
20	LPSP4006Z	Screw	M4 x 6
21	Not Available	Serial No. Label	
22	SCV1556-037	37 P Conoector	TO MAIN UNIT
23	DPSP2606Z	Screw	M2.6 x 6 Available -002 SB board and after.
24	SC44141-001	Bracket	
25	SC44142-001	Plate	

4.5 MAIN UNIT ASSEMBLY M5


2
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BNC BOARD
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MT BOARD
GPI BOARD
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PS BOARD
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80
78
61
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74
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42
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66
79
C BOARD
VIDEO BOARD
CP BOARD
WF BOARD
BC BOARD
16
60
35
76
74
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64
69
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KSG BOARD
18
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SG BOARD
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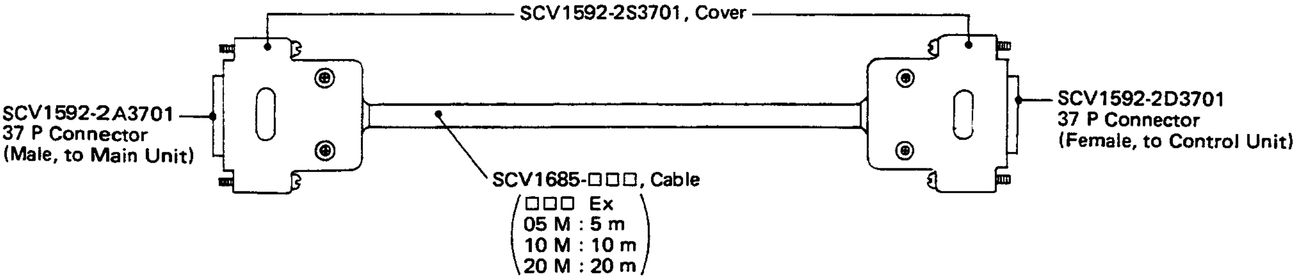
- **Main unit assembly parts list**

M5MM☐☐☐☐

Symbol No.	Part No.	Part Name	Description
1	SC20376-001	Top Cover	
2	SC41058-002	Caution Label	
3	SC43826-001	Net	
4	SC40756-001	Stopper	
5	SC40724-001	Spacer	
6	SC40703-001	Screw	
7	Not Available	Company Logo	30011PGD
8	SC20375-002	Front Panel	
9	SM40303-002	LED Lens	
⚠ 10	SC42025-001	Switch Guide	
11	SC31112-011	Side Bracket	
12	SC40702-001	Handle	
13	SC31115-002	Angle	
14	SC31114-002	PCB Holder	
15	SC43397-002	Screw	
16	SCV0296-001	Lever	
17	SC42557-002	Stud	
18	NNS2600N	Nut	
19	SC31164-00B	Panel	
20	SC40865-001	Caution Label	"E" version only
⚠ 21	2SB856C	Transistor	PS board Q1
⚠ 22	2SD880GR	Transistor	PS board Q3
23	SCV1327-001	Cover	
⚠ 24	SCV1388-001	Sheet	
25	SC43714-001	Upper Bracket	
⚠ 26	SCV1427-001	Heat Sink	
⚠ 27	2SD880GR	Transistor	PS board Q2
⚠ 28	HA17805P	IC	PS board IC2
29	SC43679-001	Lower Bracket	
⚠ 30	SCV1534-001	Power Trans	for "U" version
⚠	SCV1535-001	Power Trans	for "E" version
31	SC43929-001	Bracket	
32	GC41200-041	Guide Rail	Rivet included
33	SC10091-00B	Chassis Assembly	
34	SCV1579-001	Connector	TO CONTROL UNIT
35	E47227-006	Rubber Foot	
36	SS42474	Fuse Label	
37	YC40B	Washer	
⚠ 38	Refer to the section 1.	Fuse	
39	GL-5HD42	LED	Power indicator
40	SM3512	LED Holder	
⚠ 41	QSE2A21-S03	Power Switch	POWER
42	SC41252-001	Caution Label	
43	SC20372-00A	Bracket	for MT board
44	SCV1196-090	Connector	90 Pin, CN1~6
45	SCV1196-032	Connector	32 Pin, CN7, 8
46	Q03093-406	Washer	
47	SSV0907	Terminal	GPI, TALLY
48	SC20387-001	Rear Panel	
49	E03619-001	GND Terminal	GND
⚠ 50	SSV0961-002	Line Filter	AC INPUT
51	SCV1339	BNC Connector	Pair connector
52	SC20388-001	Rear panel	
⚠ 53	SCV1577-001	Fan Guard	
54	Not Available	Serial No. Plate	43621SS
55	SCV1435-001	Fan Motor	
56	SC43930-001	Bracket	
57	SDSP3006R	Screw	M3×6
58	SBST3006Z	Screw	M3×6
59	SSSP3006N	Screw	M3×6
60	DPSP3006Z	Screw	M3×6

Symbol No.	Part No.	Part Name	Description
61	SBST3006M	Screw	M3×6
62	SBSF3008M	Screw	M3×8
63	SSSP3010M	Screw	M3 x 10
64	SDSP3008R	Screw	M3×8
65	–	–	
66	DPSP3008N	Screw	M3×8
67	LPSP2610Z	Screw	M2.6×10
68	DPSP2606Z	Screw	M2.6×6
69	LPSP2606Z	Screw	M2.6×6
70	DPSP3025Z	Screw	M3×25
71	DPSP3012Z	Screw	M3×12
72	SDSP4012M	Screw	M4×12
73	DPSP4008Z	Screw	M4×8
74	LPSP4006Z	Screw	M4×6
75	SSSP5012N	Screw	M5×12
76	SC40855-001	Earth Label	⏚
77	LPSP3008Z	Screw	M3 x 8
78	SS47133	Cover	U version only
79	SC43934-001	Bracket	
80	SBST3008M	Screw	M3 x 8

- **Accessorie cable assembly (SCV1531-10M)**


SCV1592-2S3701, Cover
SCV1592-2A3701
37 P Connector
(Male, to Main Unit)
SCV1592-2D3701
37 P Connector
(Female, to Control Unit)
SCV1685-□□□, Cable
(□□□ Ex
05 M : 5 m
10 M : 10 m
20 M : 20 m)

Recommended maximum length is 20 m.

SECTION 5
CHARTS AND DIAGRAMS

■ SCHEMATIC DIAGRAM NOTES

- **Schematic safety precaution**

▨ parts are safety related parts.
When replacing them, be sure to use the specified parts.

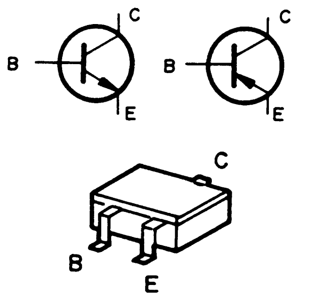
- **Measuring conditions of voltage and waveform**

Voltage: Measured with digital voltmeter in DC range just after turning on the power in the condition that the MIX/SE lever is set to "BUS A" side while the MIX lever set to "upper" side respectively.

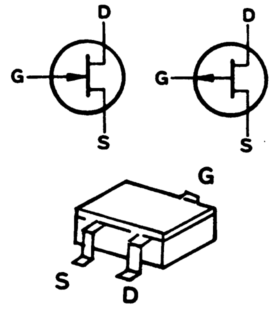
Waveform: Observed with the oscilloscope in the same condition as for voltage measurement.

- **Chip transistors and FETs**

Transistors

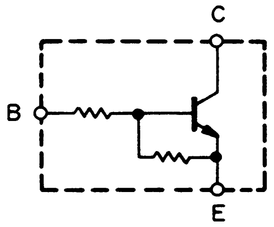


FETs



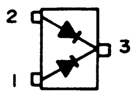
- **Digital Transistor**

DTC124K

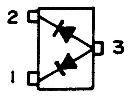


- **Chip diodes**

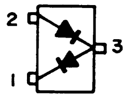
MA152WK



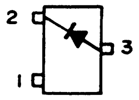
MA152WA

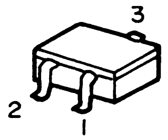


MA153



MA152A



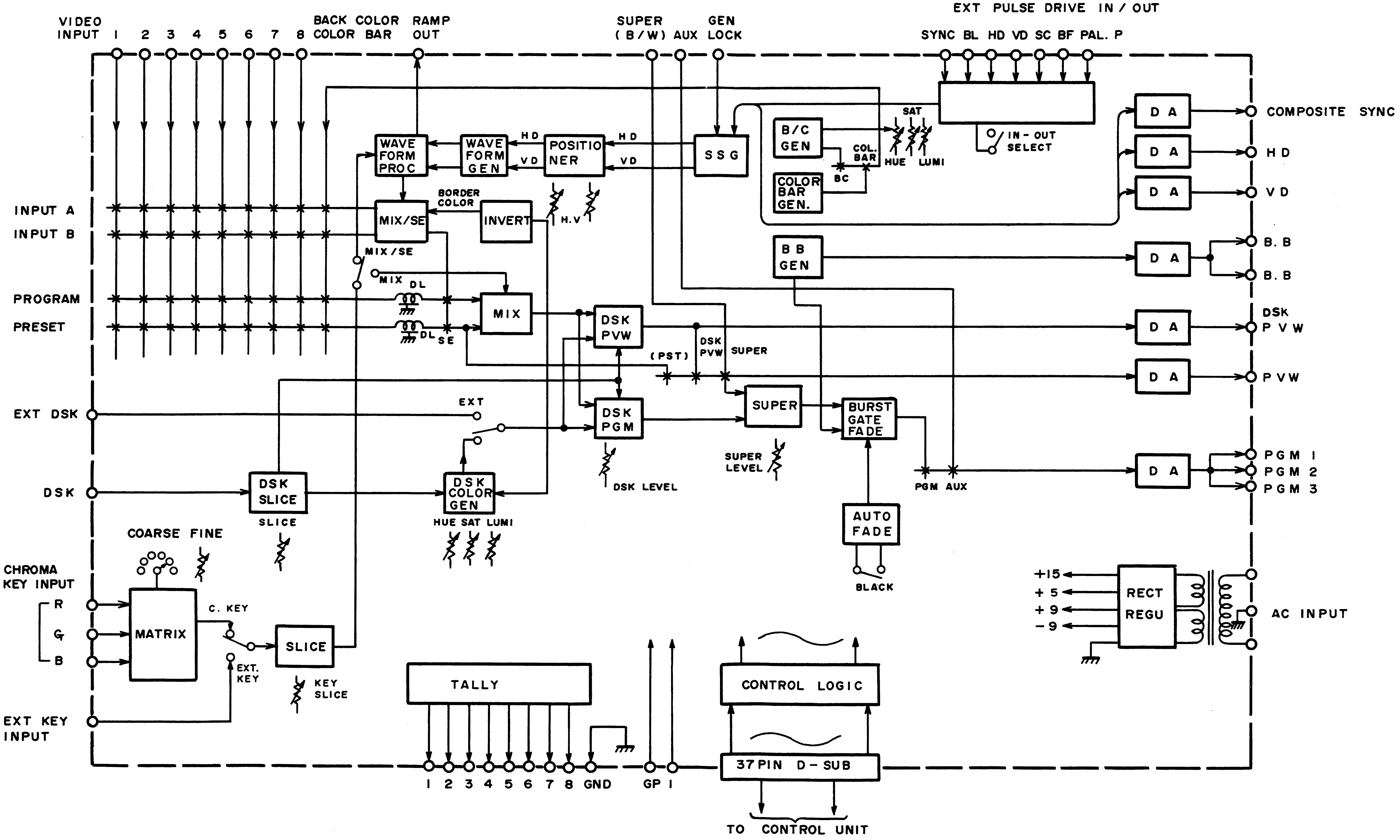


- Symbol in red in parentheses near a connector indicates a P.C. board which receives/sends input/output signals through the connector.

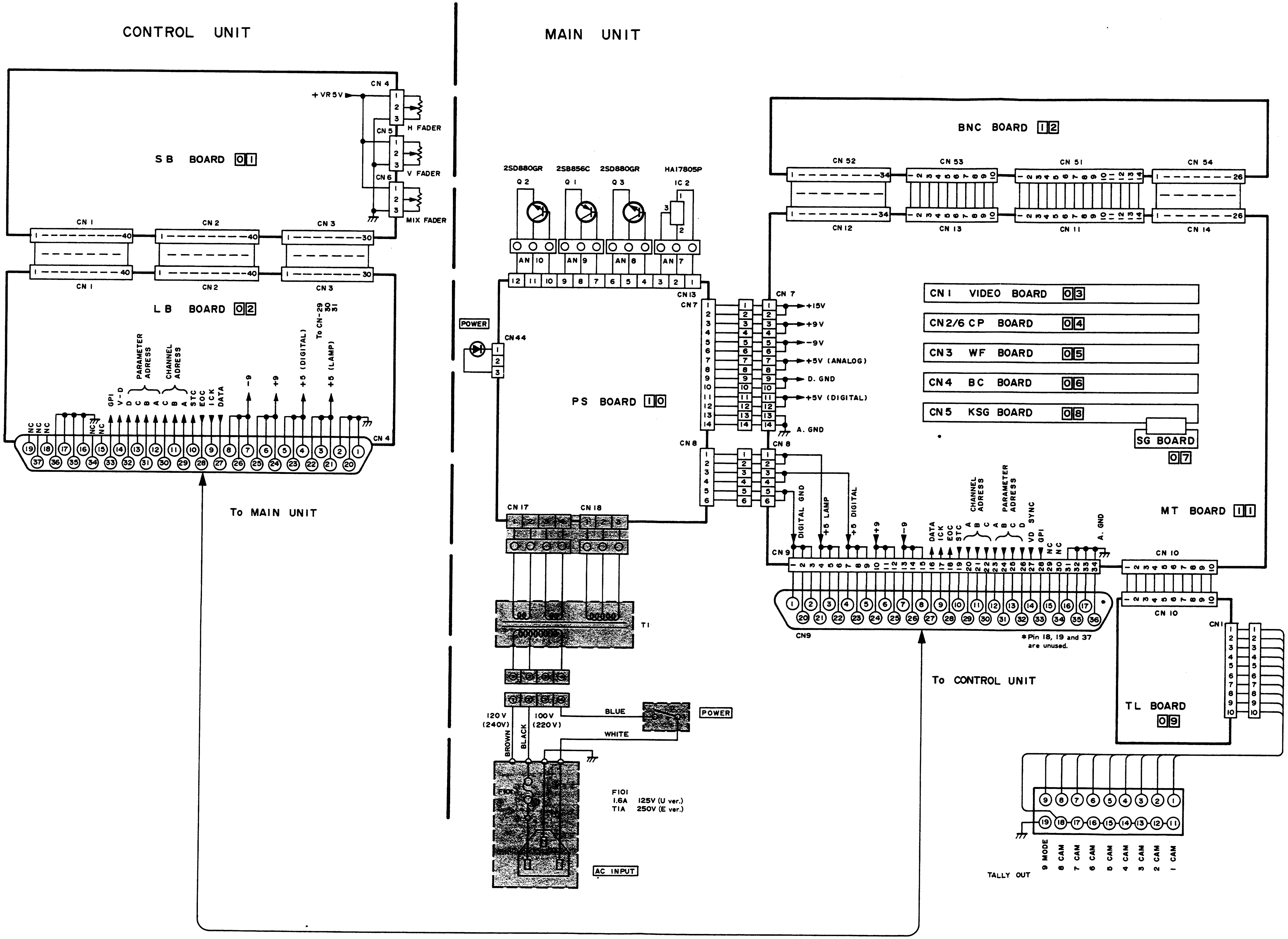
■ REPLACING SUBMINIATURE "CHIP" PARTS

- Some resistors, shoring jumpers (0 Ω resistance), ceramic capacitors, transistors, and diodes are chip parts. These chip parts cannot be reused after they are once removed.
- Soldering cautions:
  1) Do not apply heat for more than 3 seconds.
  2) Avoid using a rubbing stroke when soldering.
  3) Discard removed chips; do not reuse them.
  4) Supplementary cementing is not required.
  5) Use care not to scratch or otherwise damage the chips.
- Resistors and capacitors are not interchangeable with chip parts which is used in the color cameras BY-110, KY-210, etc., because of size difference. In case of part order, refer to the section "ELECTRICAL PARTS LIST".

5.1 KM-2500 BLOCK DIAGRAM

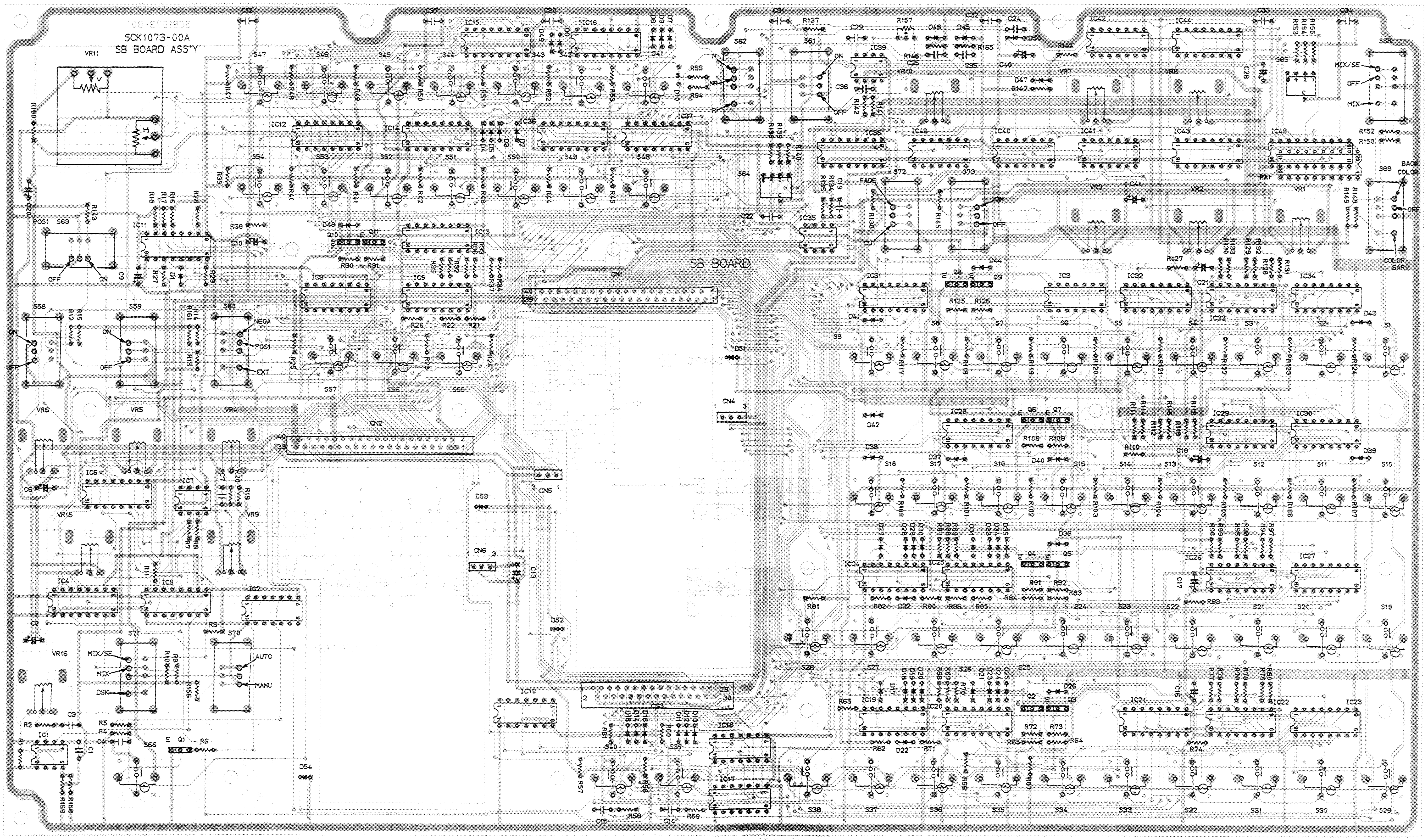

VIDEO INPUT 1 2 3 4 5 6 7 8
BACK COLOR COLOR BAR
RAMP OUT
SUPER (B/W)
AUX
GEN LOCK
EXT PULSE DRIVE IN / OUT
SYNC BL HD VD SC BF PAL. P
WAVE FORM PROC
WAVE FORM GEN
POSITIONER
HD
VD
H.V
SSG
B/C GEN
COLOR BAR GEN.
BC
COL. BAR
SAT
HUE
LUMI
IN-OUT SELECT
DA
COMPOSITE SYNC
HD
VD
B.B
B.B
BB GEN
INPUT A
INPUT B
BORDER COLOR
MIX/SE
INVERT
MIX/SE
MIX
DL
PROGRAM
PRESET
SE
MIX
DSK PVW
DSK PVW
SUPER
(PST)
DSK P V W
P V W
EXT DSK
EXT
DSK PGM
SUPER
BURST GATE FADE
SUPER LEVEL
DSK LEVEL
PGM AUX
PGM 1
PGM 2
PGM 3
DSK
DSK SLICE
SLICE
DSK COLOR GEN
HUE SAT LUMI
AUTO FADE
BLACK
COARSE FINE
CHROMA KEY INPUT
R
G
B
MATRIX
C. KEY
SLICE
EXT. KEY
KEY SLICE
EXT KEY INPUT
+15
+5
+9
-9
RECT REGU
AC INPUT
TALLY
1 2 3 4 5 6 7 8 GND
GP I
CONTROL LOGIC
37 PIN D-SUB
TO CONTROL UNIT

5.2 OVERALL WIRINGS

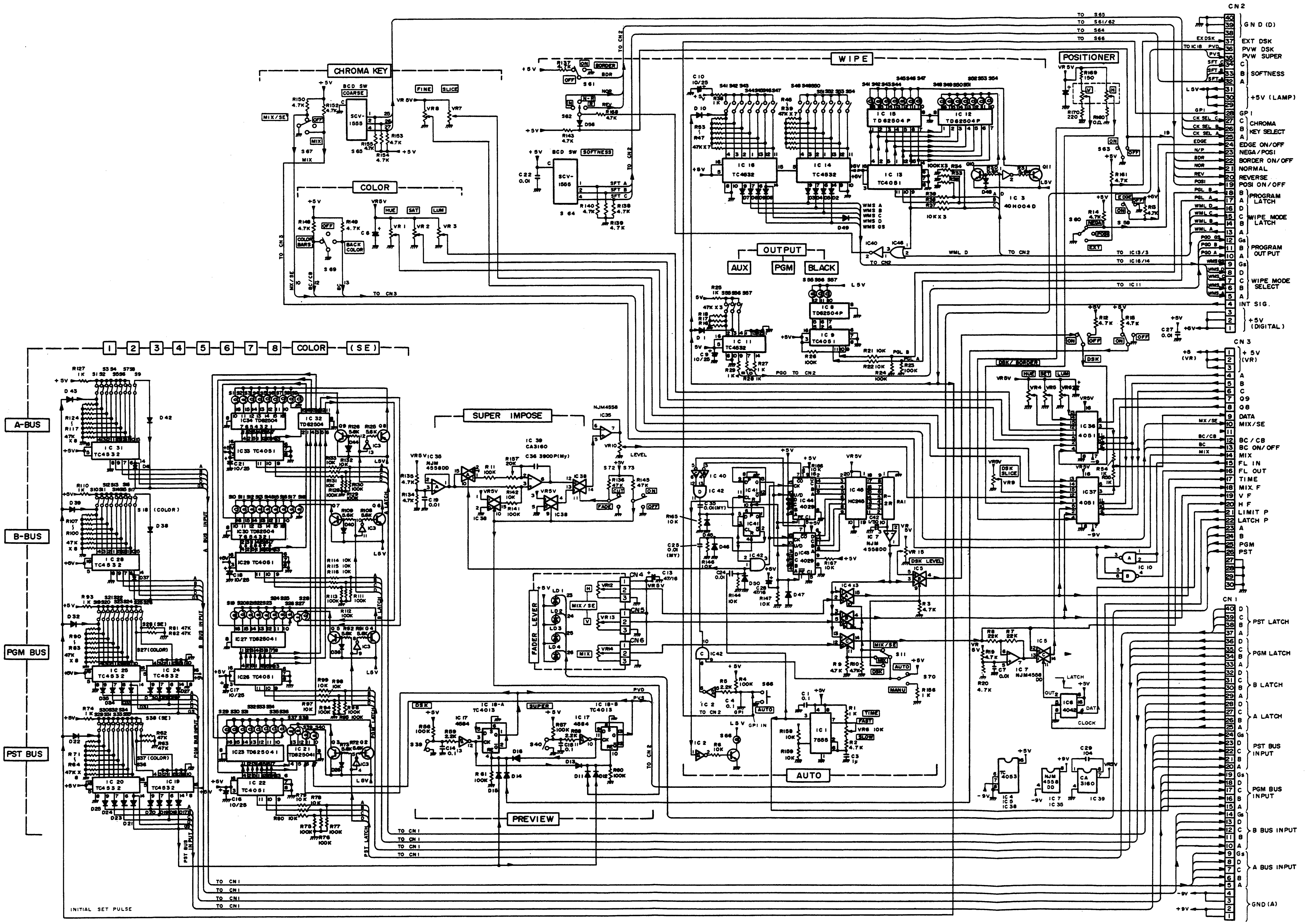

CONTROL UNIT
MAIN UNIT
SB BOARD 01
+VR5V
CN 4
CN 5
CN 6
H FADER
V FADER
MIX FADER
CN 1
CN 2
CN 3
LB BOARD 02
GPI
V-D
PARAMETER ADRESS
CHANNEL ADRESS
STC
EOC
ICK
DATA
-9
+9
+5 (DIGITAL)
+5 (LAMP)
To CN-29 30 31
NC
To MAIN UNIT
2SD880GR
2SB856C
2SD880GR
HA17805P
Q2
Q1
Q3
IC2
AN 10
AN 9
AN 8
AN 7
CN13
CN7
CN44
POWER
PS BOARD 10
CN8
CN 17
CN 18
T1
120V (240V)
100V (220V)
BROWN
BLACK
BLUE
WHITE
F101
1.6A 125V (U ver.)
T1A 250V (E ver.)
AC INPUT
BNC BOARD 12
CN 52
CN 53
CN 51
CN 54
CN 12
CN 13
CN 11
CN 14
CN 7
+15V
+9V
-9V
+5V (ANALOG)
D. GND
+5V (DIGITAL)
A. GND
CN 8
CN 1 VIDEO BOARD 03
CN2/6 CP BOARD 04
CN3 WF BOARD 05
CN4 BC BOARD 06
CN5 KSG BOARD 08
SG BOARD 07
MT BOARD 11
DIGITAL GND
+5 LAMP
+5 DIGITAL
+9
-9
DATA
ICK
EOC
STC
CHANNEL ADRESS
PARAMETER ADRESS
VD
SYNC
GPI
NC
A. GND
CN9
CN 10
*Pin 18, 19 and 37 are unused.
To CONTROL UNIT
TL BOARD 09
CN1
9 MODE
8 CAM
7 CAM
6 CAM
5 CAM
4 CAM
3 CAM
2 CAM
1 CAM
TALLY OUT

5-3

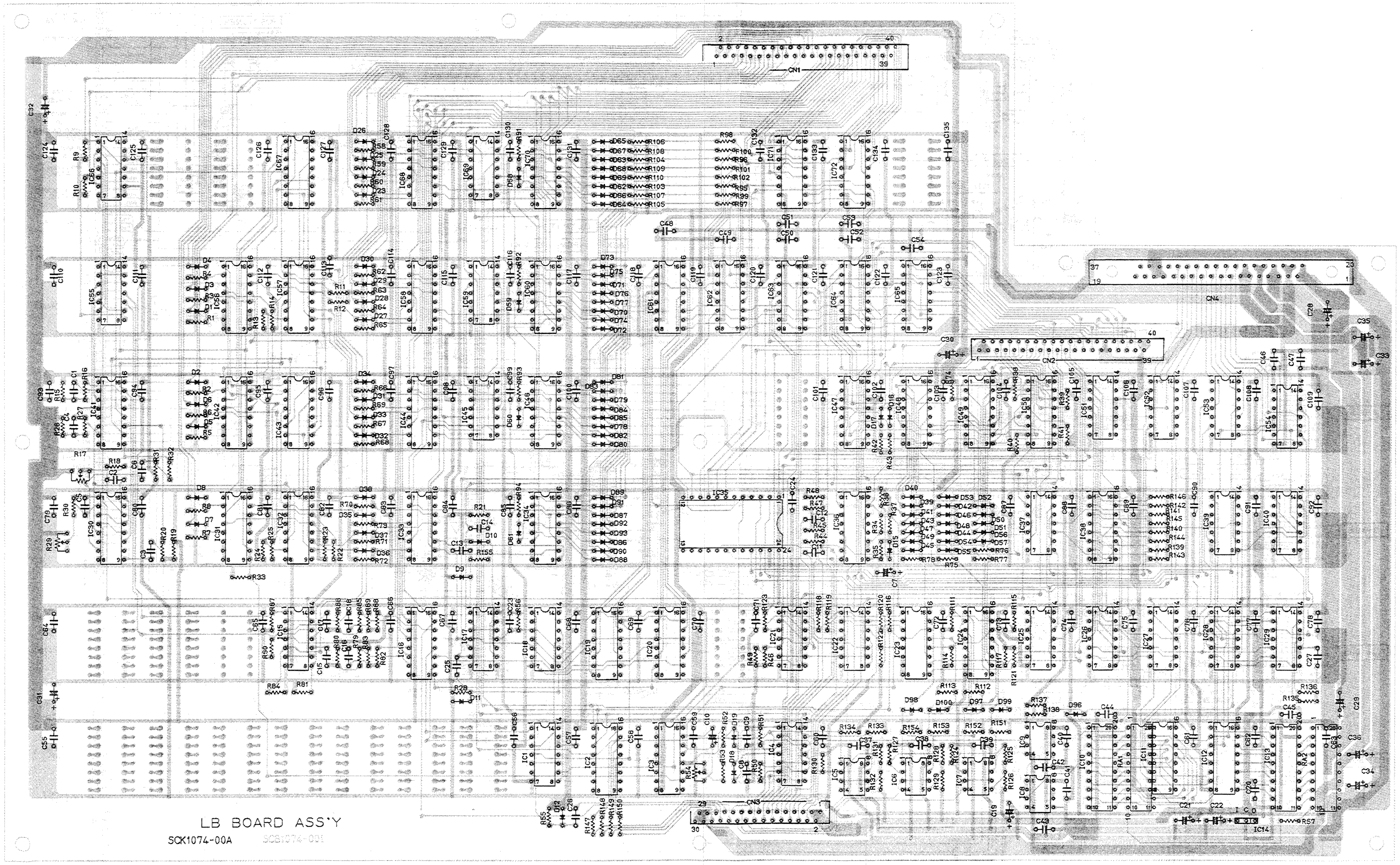
5.3 SB CIRCUIT BOARD (Soldered side view)


SCK1073-00A
SB BOARD ASS'Y
SB BOARD
CN1
CN2
CN3
CN4
CN5
CN6
VR11
MIX/SE
OFF
MIX
BACK COLOR
COLOR BAR
FADE
CUT
ON
NEGA
POSI
EXT
AUTO
MANU
DSK

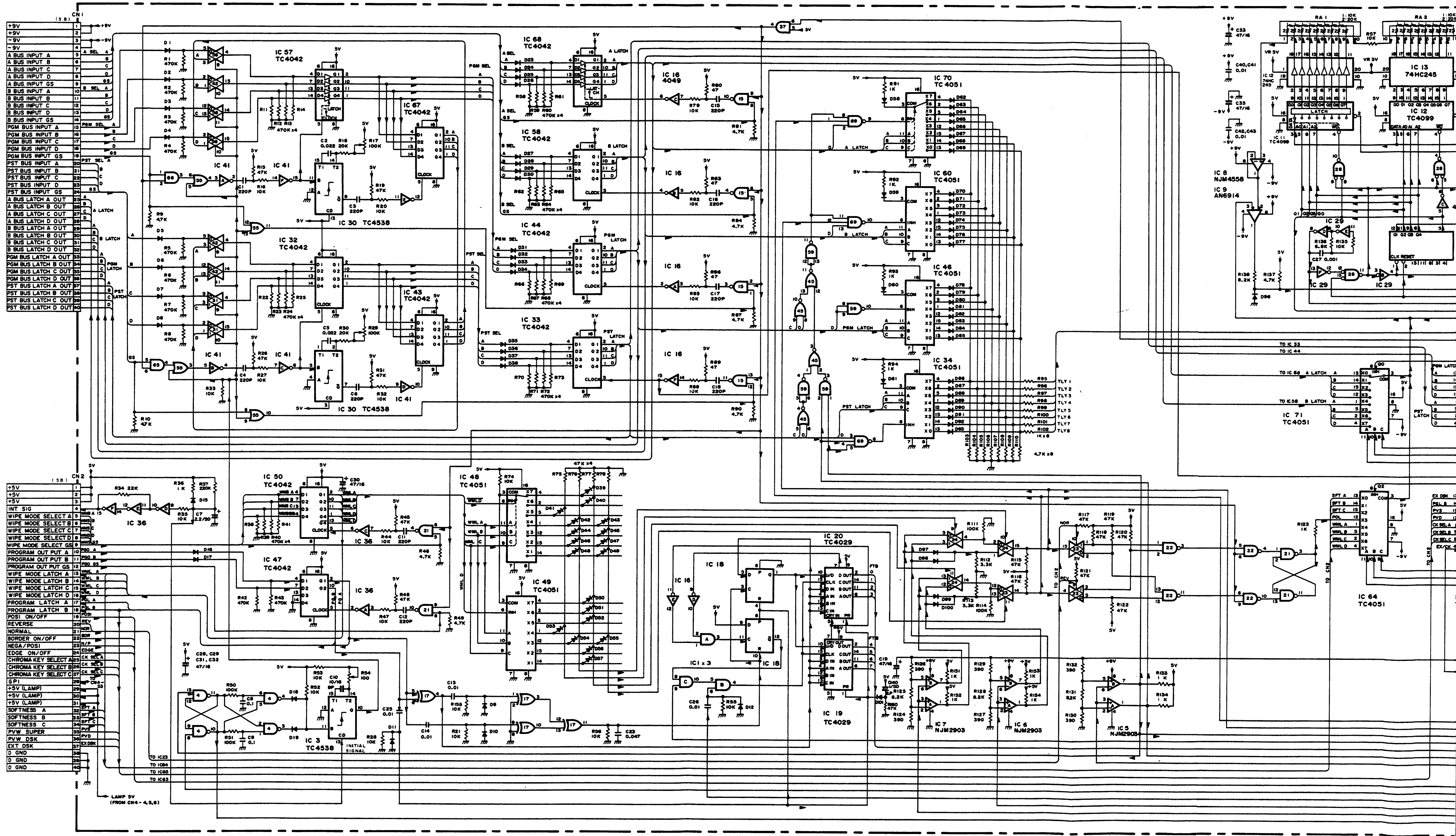
5.4 SB BOARD SCHEMATIC DIAGRAM 0 1

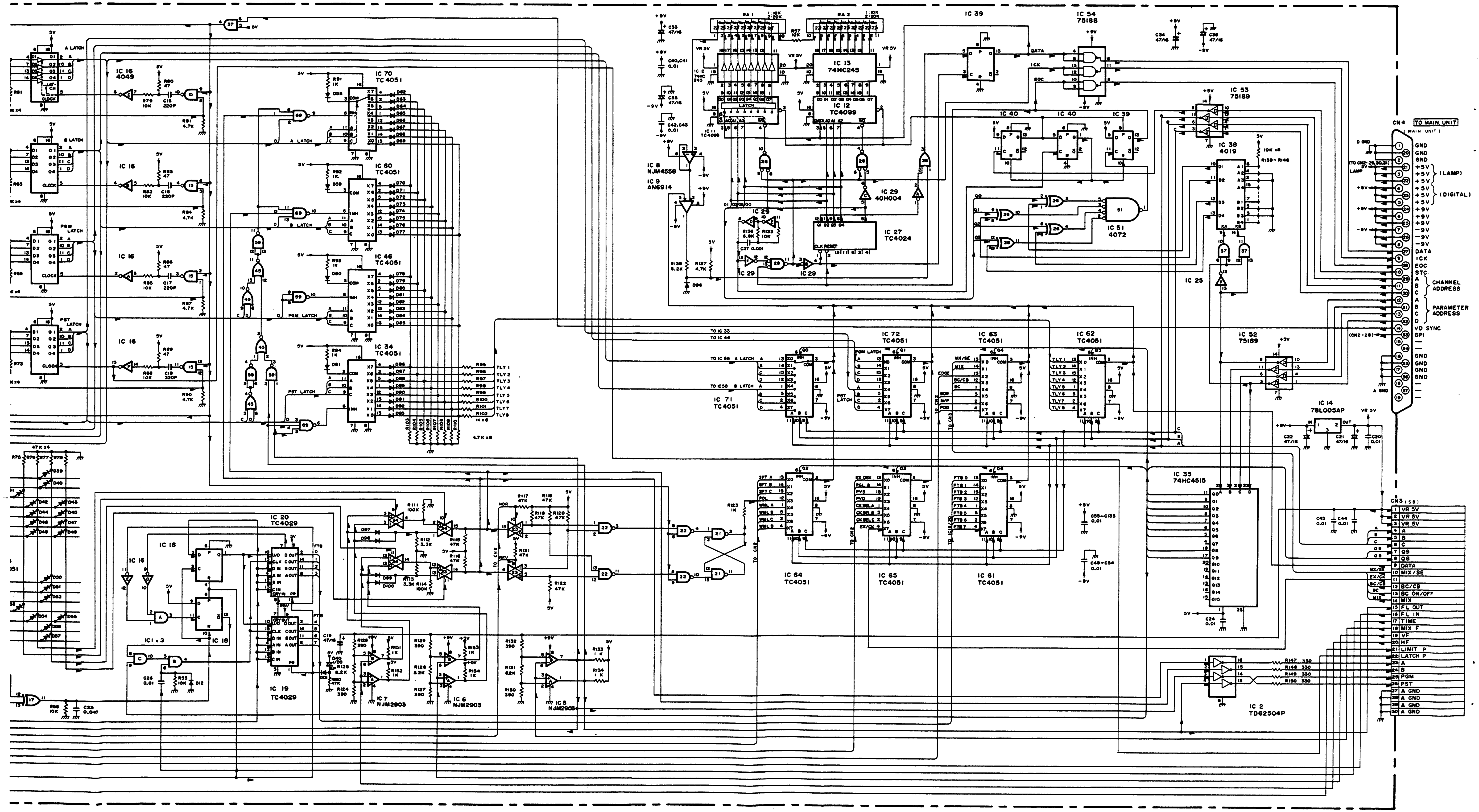

CHROMA KEY
COLOR
WIPE
POSITIONER
OUTPUT
AUX
PGM
BLACK
SUPER IMPOSE
PREVIEW
AUTO
A-BUS
B-BUS
PGM BUS
PST BUS
1
2
3
4
5
6
7
8
COLOR
(SE)
FADER LEVER
DSK LEVEL
INITIAL SET PULSE
CN2
GND (D)
EXT DSK
PVW DSK
PVW SUPER
SOFTNESS
+5V (LAMP)
GPI
CHROMA KEY SELECT
EDGE ON/OFF
NEGA/POSI
BORDER ON/OFF
NORMAL
REVERSE
POSI ON/OFF
PROGRAM LATCH
WIPE MODE LATCH
PROGRAM OUTPUT
WIPE MODE SELECT
INT SIG.
+5V (DIGITAL)
CN3
+5V (VR)
DATA
MIX/SE
BC/CB
BC ON/OFF
MIX
FL IN
FL OUT
TIME
MIX. F
V F
H F
LIMIT P
LATCH P
PGM
PST
CN1
PST LATCH
PGM LATCH
B LATCH
A LATCH
PST BUS INPUT
PGM BUS INPUT
B BUS INPUT
A BUS INPUT
GND (A)
TO CN1
TO CN2
TO CN3

5.5 LB CIRCUIT BOARD (Parts side view)

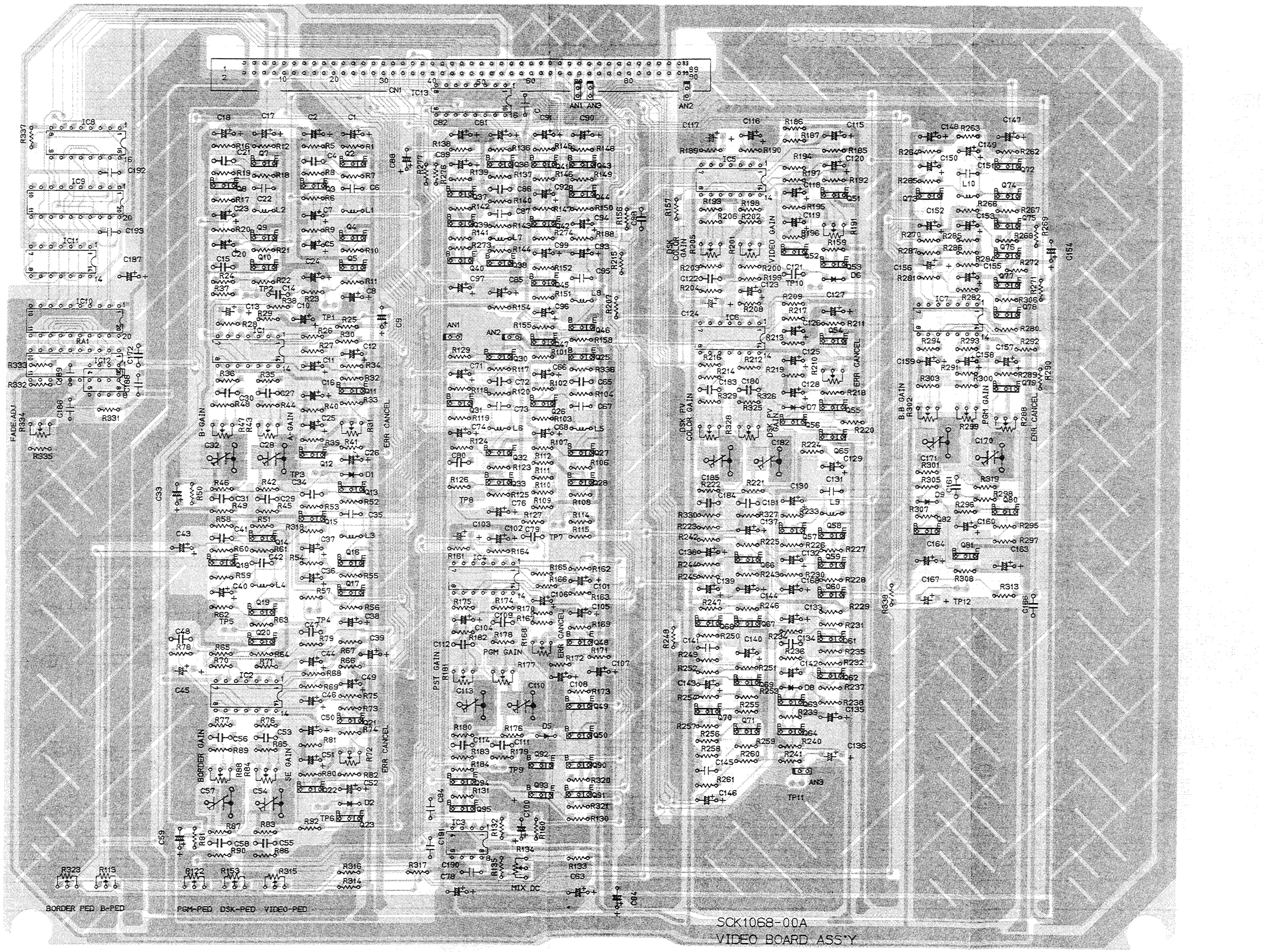

CN1
CN2
CN3
CN4
IC35
IC14
LB BOARD ASS'Y
SCK1074-00A

5.6 LB BOARD SCHEMATIC DIAGRAM 0 2

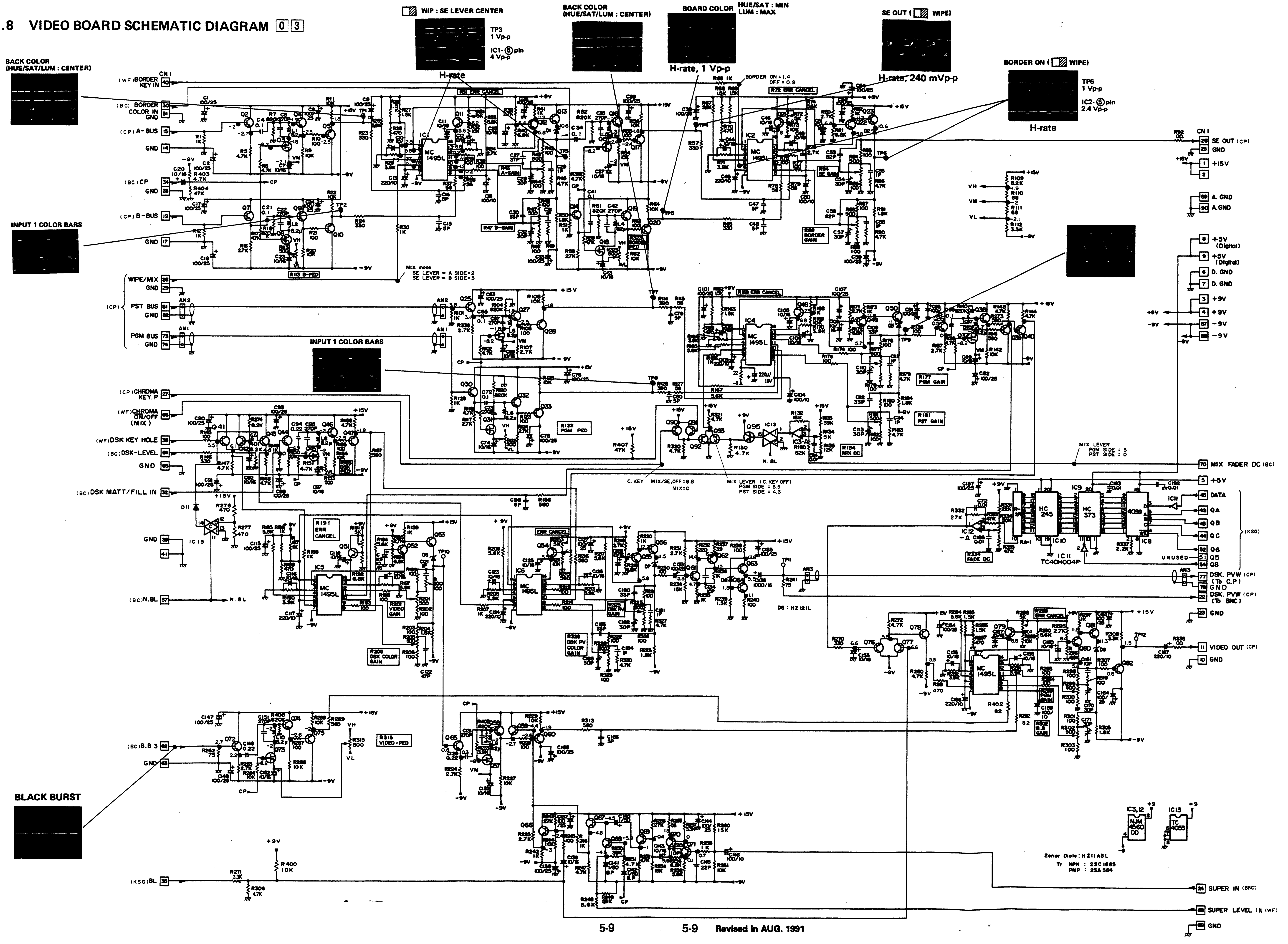

CN1
(SB)
+9V
+9V
-9V
-9V
A BUS INPUT A
A BUS INPUT B
A BUS INPUT C
A BUS INPUT D
A BUS INPUT GS
B BUS INPUT A
B BUS INPUT B
B BUS INPUT C
B BUS INPUT D
B BUS INPUT GS
PGM BUS INPUT A
PGM BUS INPUT B
PGM BUS INPUT C
PGM BUS INPUT D
PGM BUS INPUT GS
PST BUS INPUT A
PST BUS INPUT B
PST BUS INPUT C
PST BUS INPUT D
PST BUS INPUT GS
A BUS LATCH A OUT
A BUS LATCH B OUT
A BUS LATCH C OUT
A BUS LATCH D OUT
B BUS LATCH A OUT
B BUS LATCH B OUT
B BUS LATCH C OUT
B BUS LATCH D OUT
PGM BUS LATCH A OUT
PGM BUS LATCH B OUT
PGM BUS LATCH C OUT
PGM BUS LATCH D OUT
PST BUS LATCH A OUT
PST BUS LATCH B OUT
PST BUS LATCH C OUT
PST BUS LATCH D OUT
CN2
(SB)
+5V
+5V
+5V
INT SIG
WIPE MODE SELECT A
WIPE MODE SELECT B
WIPE MODE SELECT C
WIPE MODE SELECT D
WIPE MODE SELECT GS
PROGRAM OUT PUT A
PROGRAM OUT PUT B
PROGRAM OUT PUT GS
WIPE MODE LATCH A
WIPE MODE LATCH B
WIPE MODE LATCH C
WIPE MODE LATCH D
PROGRAM LATCH A
PROGRAM LATCH B
POSI ON/OFF
REVERSE
NORMAL
BORDER ON/OFF
NEGA/POSI
EDGE ON/OFF
CHROMA KEY SELECT A
CHROMA KEY SELECT B
CHROMA KEY SELECT C
GPI
+5V (LAMP)
+5V (LAMP)
+5V (LAMP)
SOFTNESS A
SOFTNESS B
SOFTNESS C
PVW SUPER
PVW DSK
EXT DSK
D GND
D GND
D GND
LAMP 5V (FROM CN4-4,5,6)
TO IC23
TO IC64
TO IC60
TO IC63
IC 57 TC4042
IC 67 TC4042
IC 30 TC4538
IC 41
IC 32 TC4042
IC 43 TC4042
IC 68 TC4042
IC 58 TC4042
IC 44 TC4042
IC 33 TC4042
IC 16 4049
IC 70 TC4051
IC 60 TC4051
IC 46 TC4051
IC 34 TC4051
IC 50 TC4042
IC 47 TC4042
IC 36
IC 48 TC4051
IC 49 TC4051
IC 3 TC4538
IC 18
IC 20 TC4029
IC 19 TC4029
IC 7 NJM2903
IC 6 NJM2903
IC 5 NJM2903
IC 8 NJM4558
IC 9 AN6914
IC 11 TC4099
IC 12 74HC245
IC 13 74HC245
IC 12 TC4099
IC 29
IC 71 TC4051
IC 64 TC4051
RA 1
RA 2
A LATCH
B LATCH
PGM LATCH
PST LATCH
PGM SEL
PST SEL
A SEL
B SEL
TLY 1
TLY 2
TLY 3
TLY 4
TLY 5
TLY 6
TLY 7
TLY 8
TO IC 33
TO IC 44
TO IC 68 A LATCH
TO IC 58 B LATCH
INITIAL SIGNAL


A LATCH
B LATCH
PGM LATCH
PST LATCH
CLOCK
IC 16 4049
IC 16
IC 70 TC4051
IC 60 TC4051
IC 46 TC4051
IC 34 TC4051
TLY 1
TLY 2
TLY 3
TLY 4
TLY 5
TLY 6
TLY 7
TLY 8
4.7K x8
1K x8
47K x4
IC 20 TC4029
IC 19 TC4029
IC 18
IC1 x 3
IC 7 NJM2903
IC 6 NJM2903
IC 5 NJM2903
NOR
REV
RA 1
RA 2
IC 13 74HC245
IC 12 TC4099
IC 11 TC4099
IC 8 NJM4558
IC 9 AN6914
IC 29 40H004
IC 27 TC4024
IC 29
IC 28
IC 39
IC 40
IC 54 75188
IC 53 75189
IC 38 4019
IC 51 4072
IC 26
IC 37
IC 25
IC 52 75189
IC 14 78L005AP
IC 71 TC4051
IC 72 TC4051
IC 63 TC4051
IC 62 TC4051
IC 64 TC4051
IC 65 TC4051
IC 61 TC4051
IC 35 74HC4515
IC 2 TD62504P
TO IC 33
TO IC 44
TO IC 68 A LATCH
TO IC 58 B LATCH
DATA
ICK
EOC
CN4
TO MAIN UNIT
(MAIN UNIT)
GND
+5V
(LAMP)
(DIGITAL)
+9V
-9V
STC
CHANNEL ADDRESS
PARAMETER ADDRESS
VD SYNC
GPI
A GND
D GND
CN3 (SB)
1 VR 5V
2 VR 5V
3 VR 5V
4 A
5 B
6 C
7 Q9
8 Q8
9 DATA
10 MIX/SE
11
12 BC/CB
13 BC ON/OFF
14 MIX
15 FL OUT
16 FL IN
17 TIME
18 MIX F
19 VF
20 HF
21 LIMIT P
22 LATCH P
23 A
24 B
25 PGM
26 PST
27 A GND
28 A GND
29 A GND
30 A GND
R147 330
R148 330
R149 330
R150 330

5.7 VIDEO CIRCUIT BOARD (Parts side view)

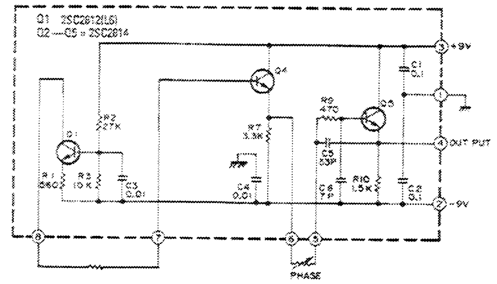

CN1
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
AN1
AN2
AN3
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
B-GAIN
A-GAIN
ERR CANCEL
BORDER GAIN
SE GAIN
PST GAIN
PGM GAIN
DSK COLOR GAIN
VIDEO GAIN
DSK PV COLOR GAIN
DSK PV
B.B GAIN
FADE ADJ
MIX DC
BORDER PED
B-PED
PGM-PED
DSK-PED
VIDEO-PED
SCK1068-00A
VIDEO BOARD ASS'Y

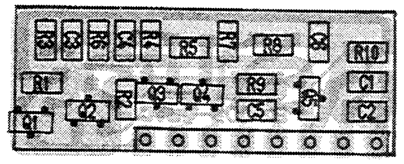
5.8 VIDEO BOARD SCHEMATIC DIAGRAM 0 3


▨ WIP : SE LEVER CENTER
TP3
1 Vp-p
IC1-⑤pin
4 Vp-p
H-rate
BACK COLOR (HUE/SAT/LUM : CENTER)
BOARD COLOR
HUE/SAT : MIN
LUM : MAX
H-rate, 1 Vp-p
SE OUT (▨ WIPE)
H-rate, 240 mVp-p
BORDER ON (▨ WIPE)
TP6
1 Vp-p
IC2-⑤pin
2.4 Vp-p
H-rate
BACK COLOR (HUE/SAT/LUM : CENTER)
INPUT 1 COLOR BARS
INPUT 1 COLOR BARS
BLACK BURST
CN I
(WF) BORDER KEY IN 40
(BC) BORDER COLOR IN 30
GND 31
(CP) A-BUS 15
GND 14
(BC) CP 34
GND 33
(CP) B-BUS 19
GND 17
WIPE/MIX 28
GND 29
(CP) PST BUS 81
GND 82
PGM BUS 73
GND 74
(CP) CHROMA KEY. P 27
(WF) CHROMA ON/OFF (MIX) 66
(WF) DSK KEY HOLE 38
(BC) DSK-LEVEL 64
GND 65
(BC) DSK MATT/FILL IN 32
GND 36
41
(BC) N.BL 37
(BC) B.B 3 62
GND 63
(KSG) BL 35
26 SE OUT (CP)
25 GND
1 +15V
2
89 A.GND
90 A.GND
8 +5V (Digital)
9 +5V (Digital)
6 D. GND
7 D. GND
3 +9V
4 +9V
87 -9V
88 -9V
70 MIX FADER DC (BC)
5 +5V
45 DATA
42 QA
43 QB
44 QC
52 Q6
51 Q5
54 Q8
(KSG)
UNUSED
77 DSK. PVW (CP) (To C.P)
76 GND
22 DSK. PVW (CP) (To BNC)
23 GND
11 VIDEO OUT (CP)
10 GND
24 SUPER IN (BNC)
68 SUPER LEVEL IN (WF)
69 GND
IC1 MC 1495L
IC2 MC 1495L
IC4 MC 1495L
IC5 MC 1495L
IC6 MC 1495L
MC 1495L
HC 245
HC 373
4099
IC9
IC10
IC8
IC11 TC40H004P
IC12
IC13
R36 ERR CANCEL
R45 A-GAIN
R47 B-GAIN
R13 B-PED
R72 ERR CANCEL
R88 BORDER GAIN
R94 SE GAIN
R188 ERR CANCEL
R177 PGM GAIN
R181 PST GAIN
R122 PGM PED
R134 MIX DC
R191 ERR CANCEL
R201 VIDEO GAIN
R205 DSK COLOR GAIN
R329 DSK PV COLOR GAIN
R334 FADE DC
R315 VIDEO-PED
MIX mode
SE LEVER → A SIDE = 2
SE LEVER → B SIDE = 3
BORDER ON = 1.4
OFF = 0.9
MIX LEVER
PGM SIDE = 5
PST SIDE = 0
C.KEY MIX/SE,OFF = 8.8
MIX = 0
MIX LEVER (C.KEY OFF)
PGM SIDE = 3.5
PST SIDE = 4.3
D8 : HZ 12IL
IC3,12 NJM 4560 DD
IC13 TC 4053
Zener Diode : HZ11A3L
Tr NPN : 2SC1685
PNP : 2SA564
VH
VM
VL
+15V
-9V
+9V
-9V

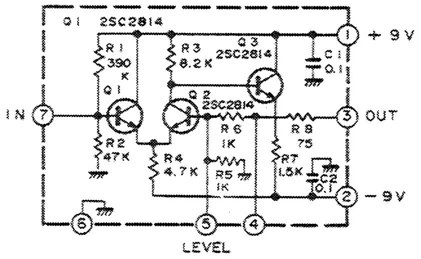
5.9 CP CIRCUIT BOARDS (Parts side view)

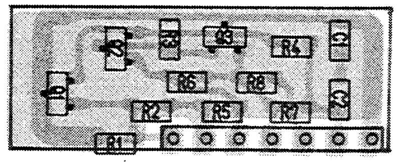
● BUFFER AMP CBM [CBMC4373-00A](CBM1-4)


Q1 2SC2812(L6)
Q2 — Q5 = 2SC2814
+9V
Q4
R2 27K
Q1
R9 470
Q5
R7 3.3K
OUT PUT
C5 33P
R1 560
R3 10K
C3 0.01
C4 0.01
C6 7P
R10 1.5K
C1 0.1
C2 0.1
-9V
PHASE

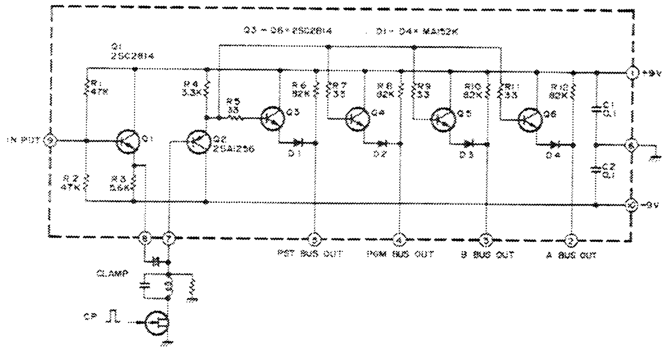

R3
R2
R1
Q1
Q2
Q3
Q4
R5
R7
R8
R9
C5
Q5
R10
C1
C2

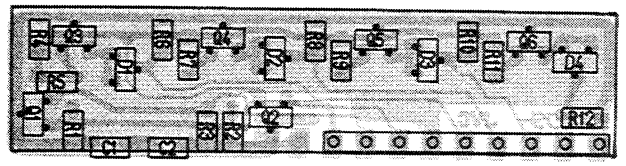
● VIDEO AMP CBM [CBMC4396-00A](CBM5-7)


Q1 2SC2814
R1 390 K
R3 8.2K
Q3 2SC2814
C1 0.1
+9V
IN
Q1
Q2 2SC2814
OUT
R2 47K
R4 4.7K
R6 1K
R5 1K
R8 75
R7 1.5K
C2 0.1
-9V
LEVEL

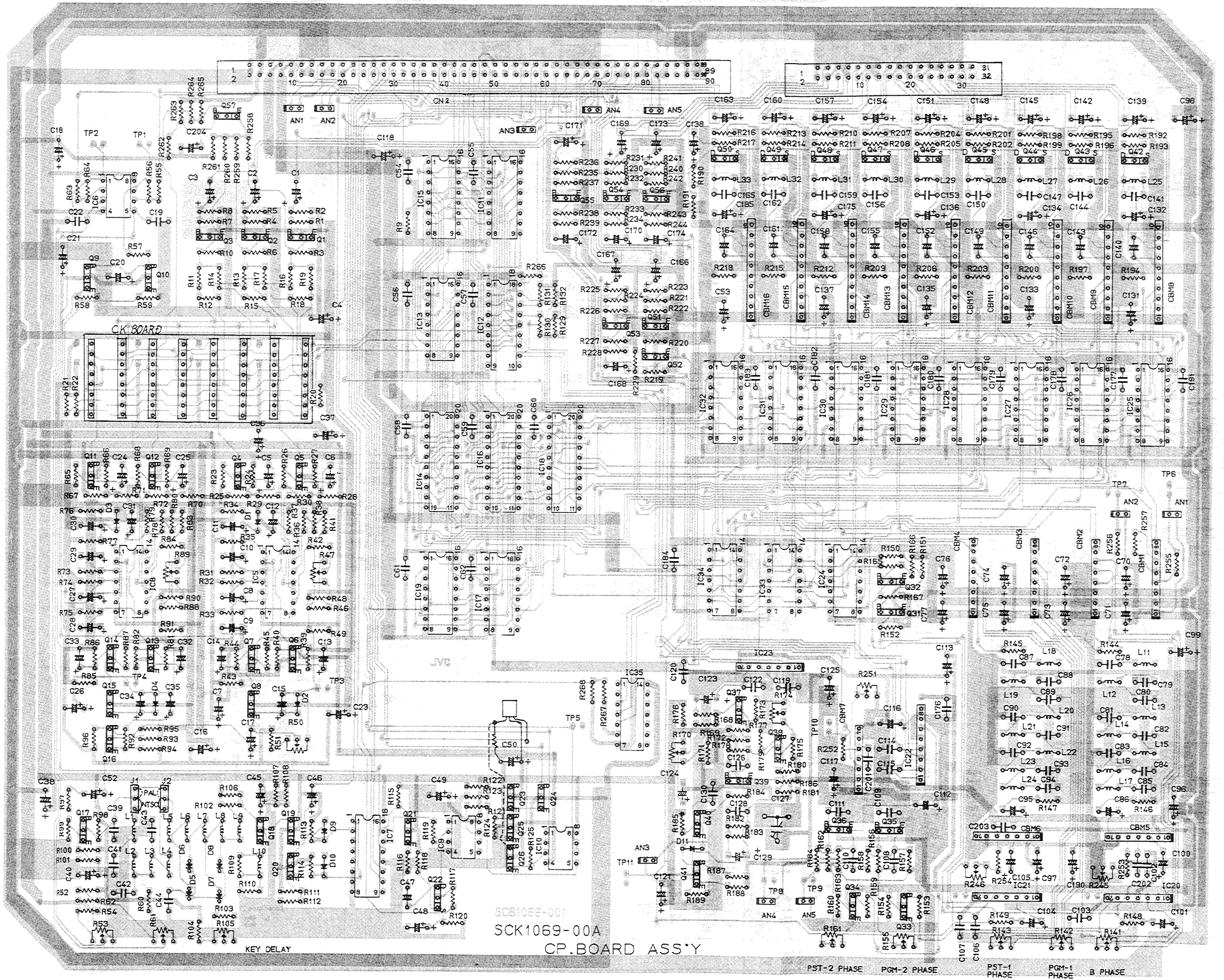

R3
Q3
R4
C1
Q2
Q1
R6
R8
C2
R2
R5
R7
R1

● CROSS POINT CBM [CBMC4375-00A](CBM8-16)


Q3 ~ Q6 = 2SC2814
D1 ~ D4 = MA152K
Q1 2SC2814
R1 47K
R4 3.3K
R5 33
R6 82K
R7 33
R8 82K
R9 33
R10 82K
R11 33
R12 82K
+9V
IN PUT
Q1
Q2 2SA1256
Q3
Q4
Q5
Q6
D1
D2
D3
D4
C1 0.1
C2 0.1
R2 47K
R3 5.6K
-9V
PST BUS OUT
PGM BUS OUT
B BUS OUT
A BUS OUT
CLAMP
CP

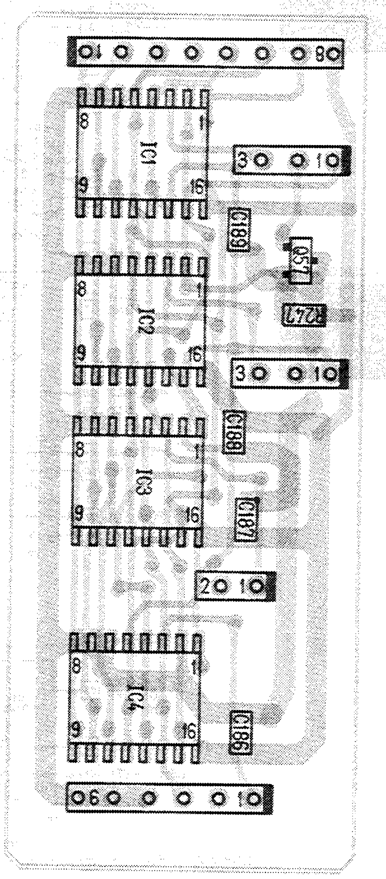

R4
Q3
R5
D1
R6
R7
Q4
D2
R8
Q5
R9
D3
R10
R11
Q6
D4
R12
Q1
R1
C1
C2
R3
R2
Q2

- **CP board**

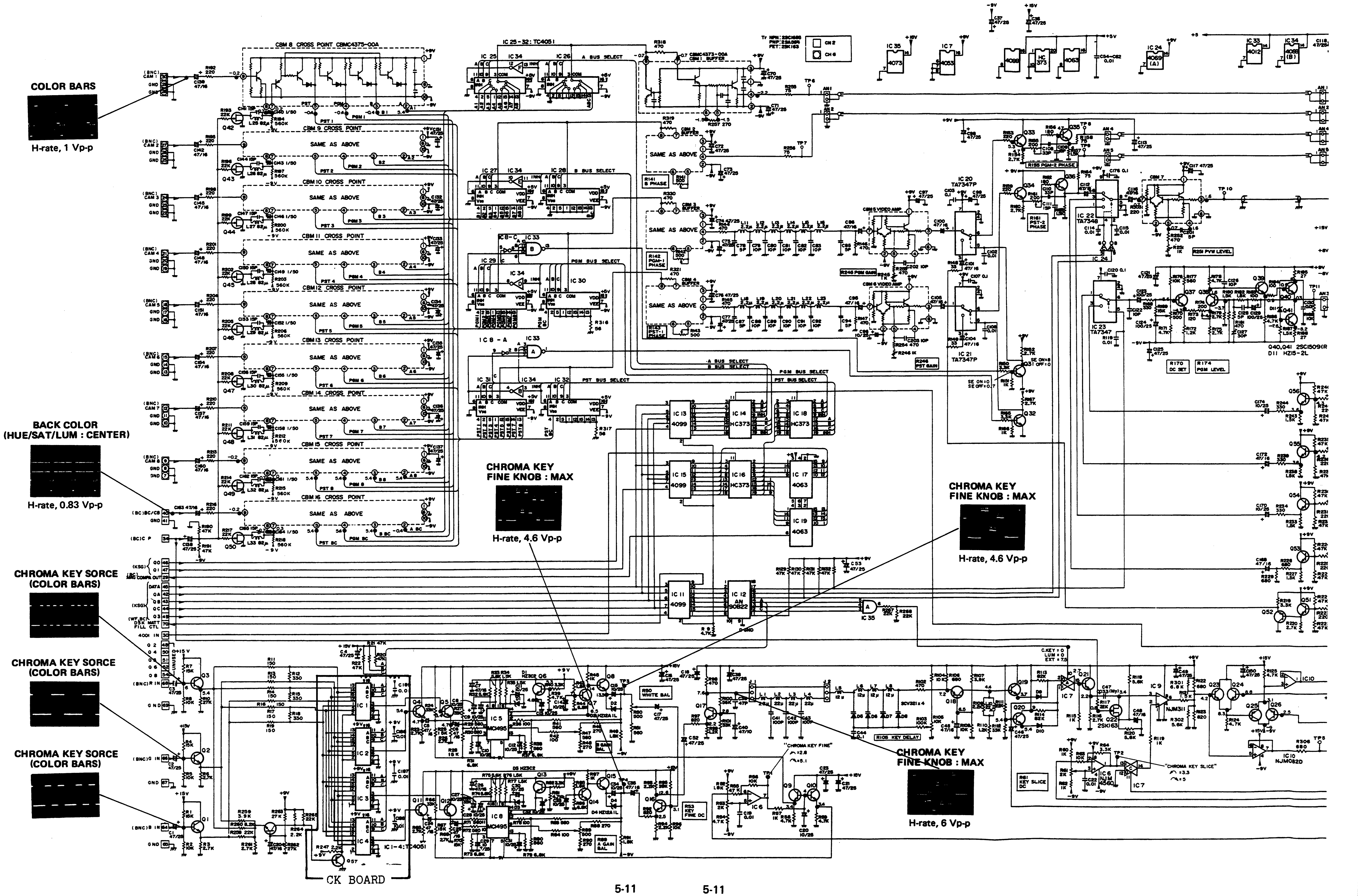

CN2
CK BOARD
JVC
SCK1069-00A
CP.BOARD ASS'Y
KEY DELAY
PAL
NTSC
PST-2 PHASE
PGM-2 PHASE
PST-1 PHASE
PGM-1 PHASE
B PHASE
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
AN1
AN2
AN3
AN4
AN5

- **CK board**

(Not availabe on the -002 CP board and after)


IC1
IC2
IC3
IC4
C186
C187
C188
C189
Q57
R270

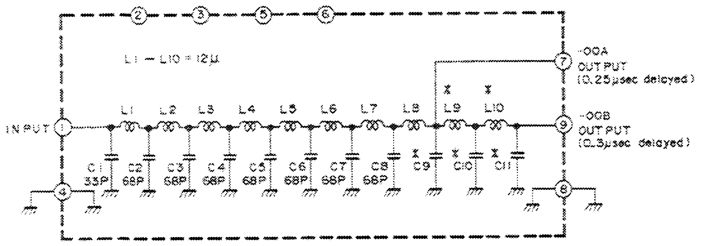
5.10 CP BOARD SCHEMATIC DIAGRAM 0 4


COLOR BARS
H-rate, 1 Vp-p
BACK COLOR
(HUE/SAT/LUM : CENTER)
H-rate, 0.83 Vp-p
CHROMA KEY SORCE
(COLOR BARS)
CHROMA KEY SORCE
(COLOR BARS)
CHROMA KEY SORCE
(COLOR BARS)
CHROMA KEY
FINE KNOB : MAX
H-rate, 4.6 Vp-p
CHROMA KEY
FINE KNOB : MAX
H-rate, 4.6 Vp-p
CHROMA KEY
FINE KNOB : MAX
H-rate, 6 Vp-p
CBM 8 CROSS POINT CBMC4375-00A
CBM 9 CROSS POINT
CBM 10 CROSS POINT
CBM 11 CROSS POINT
CBM 12 CROSS POINT
CBM 13 CROSS POINT
CBM 14 CROSS POINT
CBM 15 CROSS POINT
CBM 16 CROSS POINT
SAME AS ABOVE
IC 25-32: TC4051
A BUS SELECT
B BUS SELECT
PGM BUS SELECT
PST BUS SELECT
IC 13 4099
IC 14 HC373
IC 18 HC373
IC 15 4099
IC 16 HC373
IC 17 4063
IC 19 4063
IC 11 4099
IC 12 AN 90B22
IC 20 TA7347P
IC 21 TA7347P
IC 22 TA7348
IC 23 TA7347
IC 5 MC1495
IC 8 MC1495
IC1-4: TC4051
CK BOARD
"CHROMA KEY FINE"
"CHROMA KEY SLICE"
NJM311
IC10 NJM082D
Q40,Q41 2SC1509(R)
D11 HZ15-2L

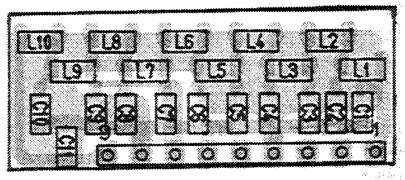
IDEO

5.11 WF CIRCUIT BOARDS (Parts side view)

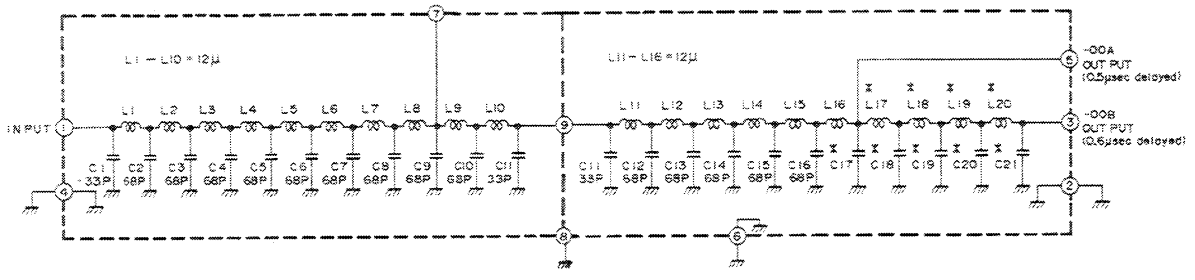
●DL-25 CBM [CBMC3436-00A](CBM1)


L1 – L10 = 12μ
INPUT
-00A OUTPUT (0.25μsec delayed)
-00B OUTPUT (0.3μsec delayed)
L1 L2 L3 L4 L5 L6 L7 L8 L9 L10
C1 33P C2 68P C3 68P C4 68P C5 68P C6 68P C7 68P C8 68P C9 C10 C11

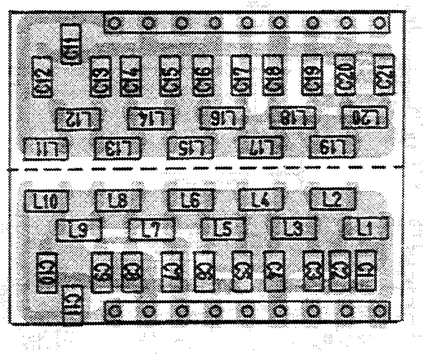
※	-00A	-00B
C9	33P	68P
C10	OPEN	68P
C11	OPEN	33P
L9	OPEN	12μ
L10	OPEN	12μ



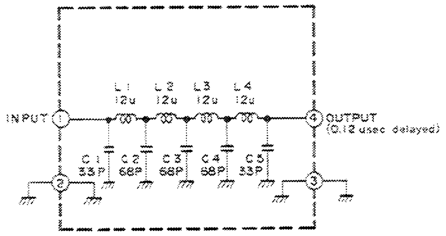
●DL-50 CBM [CBMC3437-00A](CBM2)

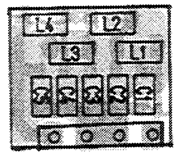

L1 – L10 = 12μ
L11 – L16 = 12μ
INPUT
-00A OUT PUT (0.5μsec delayed)
-00B OUT PUT (0.6μsec delayed)

※	-00A	-00B
C17	33P	68P
C18	OPEN	68P
C19	OPEN	68P
C20	OPEN	68P
C21	OPEN	33P
L17 – L20	OPEN	12μ

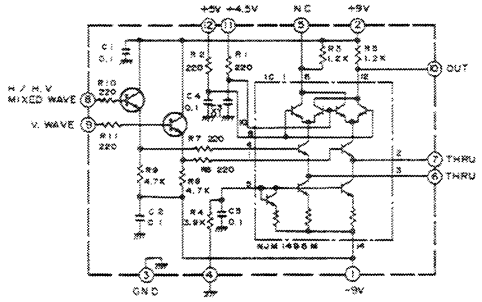


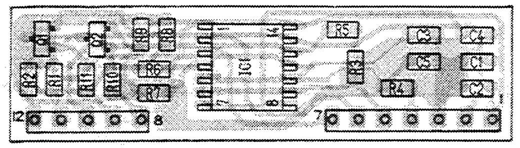
●DL-12 CBM [CBMC3438-00A](CBM3)


INPUT
OUTPUT (0.12μsec delayed)
L1 12μ L2 12μ L3 12μ L4 12μ
C1 33P C2 68P C3 68P C4 68P C5 33P

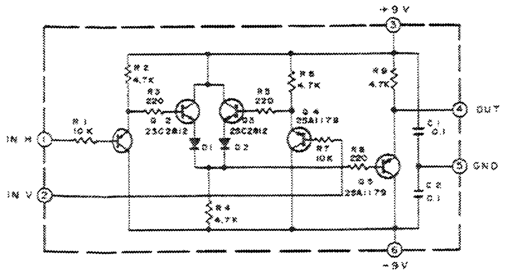


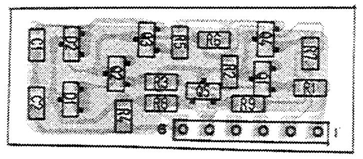
●COMPA CBM [CBMC4351-00B](CBM5-8)


+5V +4.5V NC +9V
H/V MIXED WAVE
V. WAVE
OUT
THRU 1
THRU 2
NJM1496M
GND
-9V

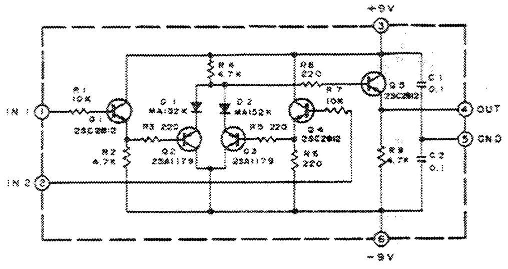


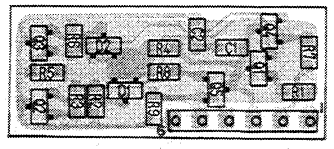
●OR CBM [CBMC4357-00B](CBM9,11)


+9V
IN H
IN V
OUT
GND
-9V

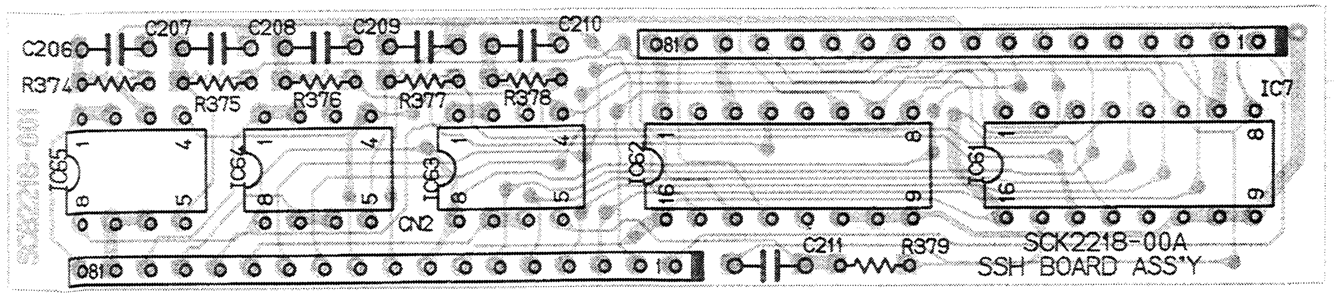


●AND CBM [CBMC4354-00C](CBM10,12)

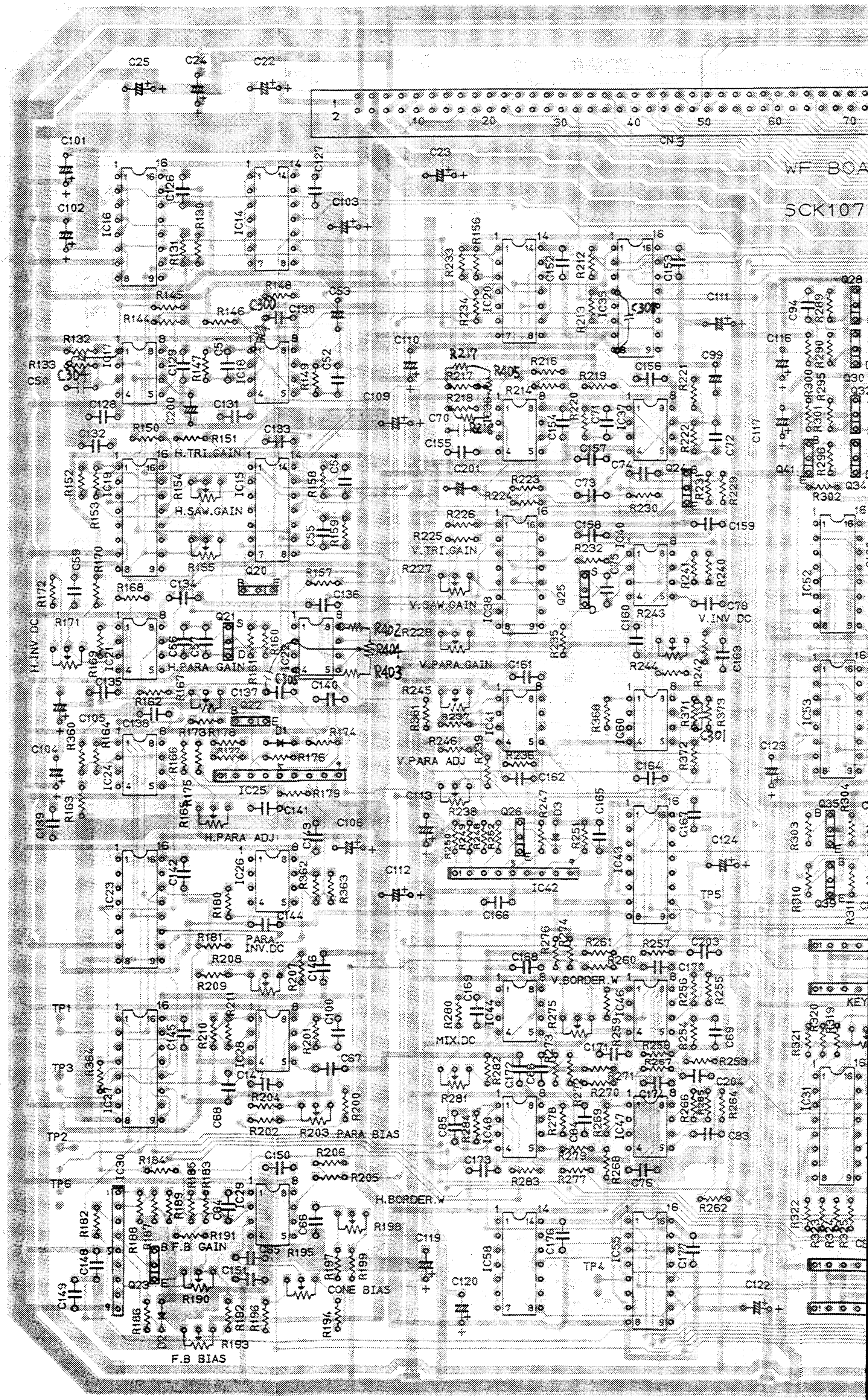

+9V
IN 1
IN 2
OUT
GND
-9V

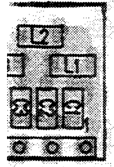


● SSH board

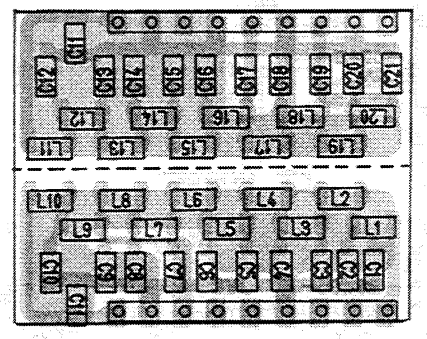

C206 C207 C208 C209 C210
R374 R375 R376 R377 R378
IC65 IC64 IC63 IC62 IC61 IC7
CN2
C211 R379
SCK2218-00A
SSH BOARD ASS'Y

●WF board

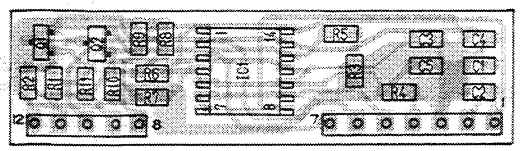

WF BOA
SCK107
H.TRI.GAIN
H.SAW.GAIN
H.PARA GAIN
H.PARA ADJ
H.INV DC
PARA INV.DC
F.B GAIN
F.B BIAS
CONE BIAS
PARA BIAS
H.BORDER W
V.TRI.GAIN
V.SAW.GAIN
V.PARA GAIN
V.PARA ADJ
V.INV DC
V.BORDER W
MIX.DC
TP1 TP2 TP3 TP4 TP5 TP6



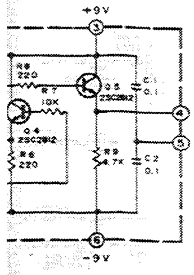
	-00A	-00B
17	33P	68P
18	OPEN	68P
19	OPEN	68P
20	OPEN	68P
21	OPEN	33P
~ L20	OPEN	12μ

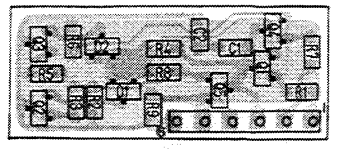

L1
L2
L10
L11
L20
L21

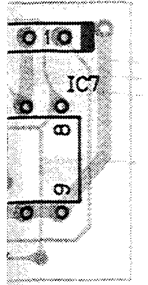
OOB](CBM5-8)


IC1
R1
R2
R3
R4
R5
R6
R7
C1
C2
C3
C4
C5

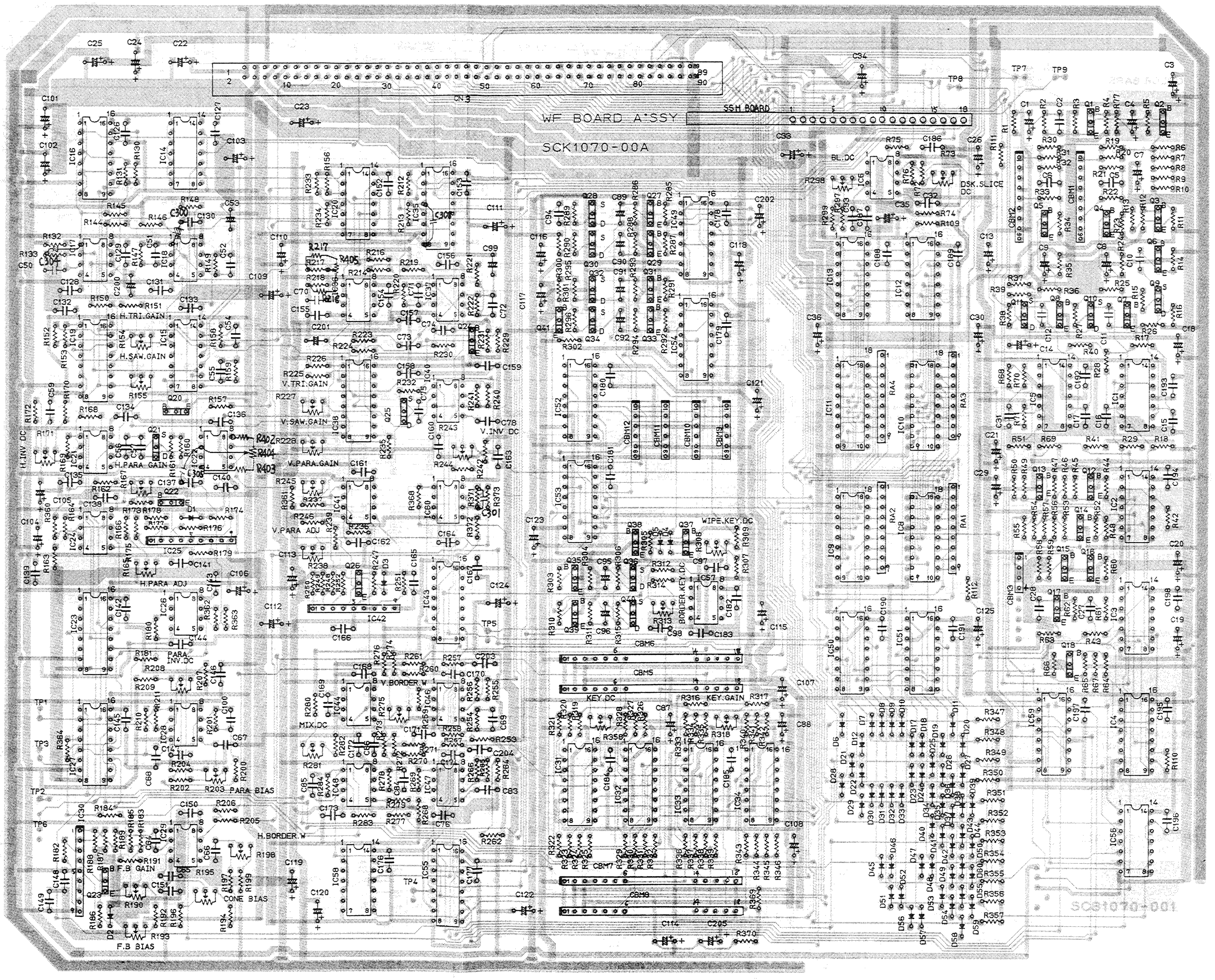
MC4354-OOC](CBM10,12)


+9V
-9V
OUT
GND
R8 220
R6 220
Q4
Q5
C1 0.1
C2 0.1

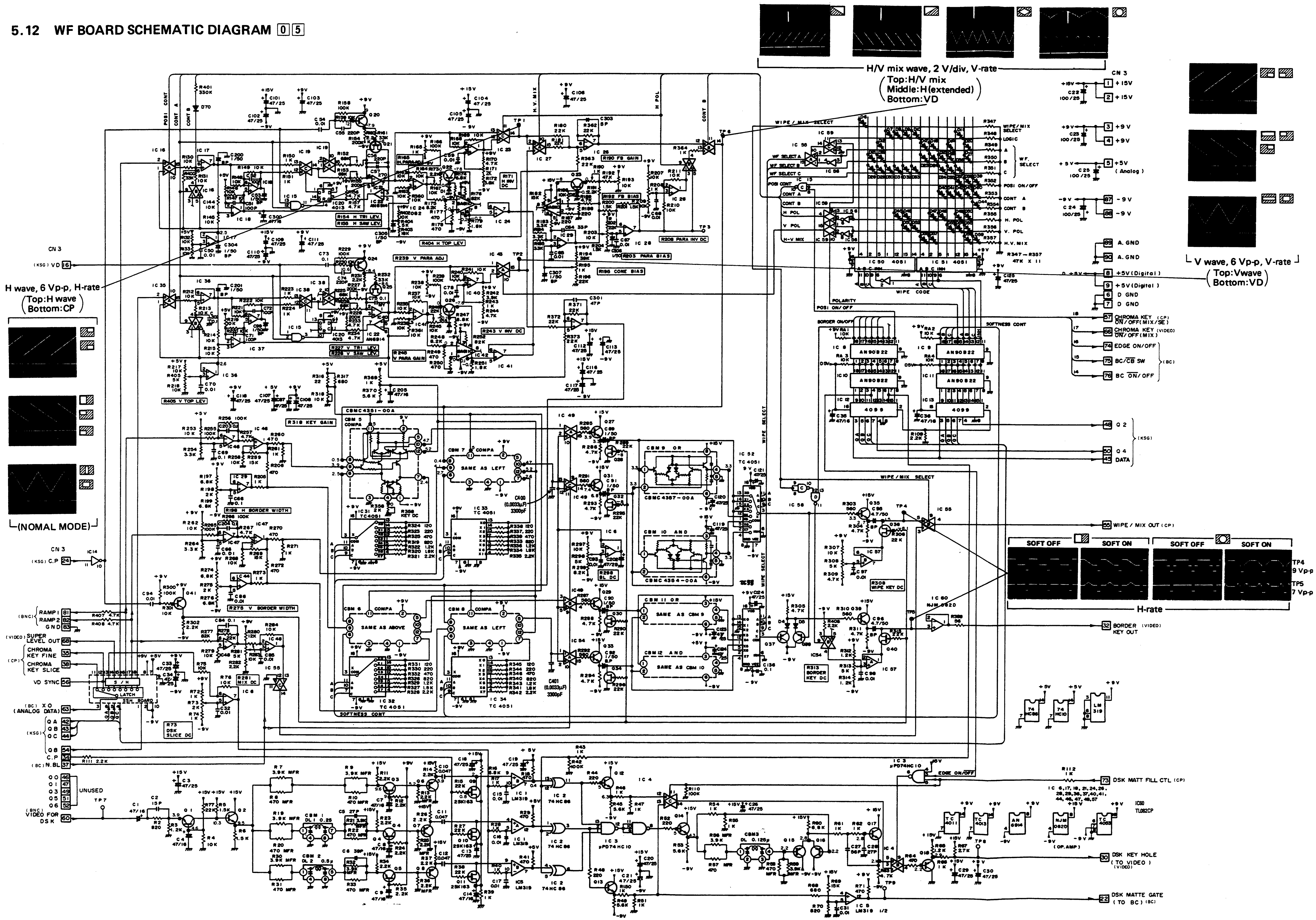

R1
R4
R5
R8
C1



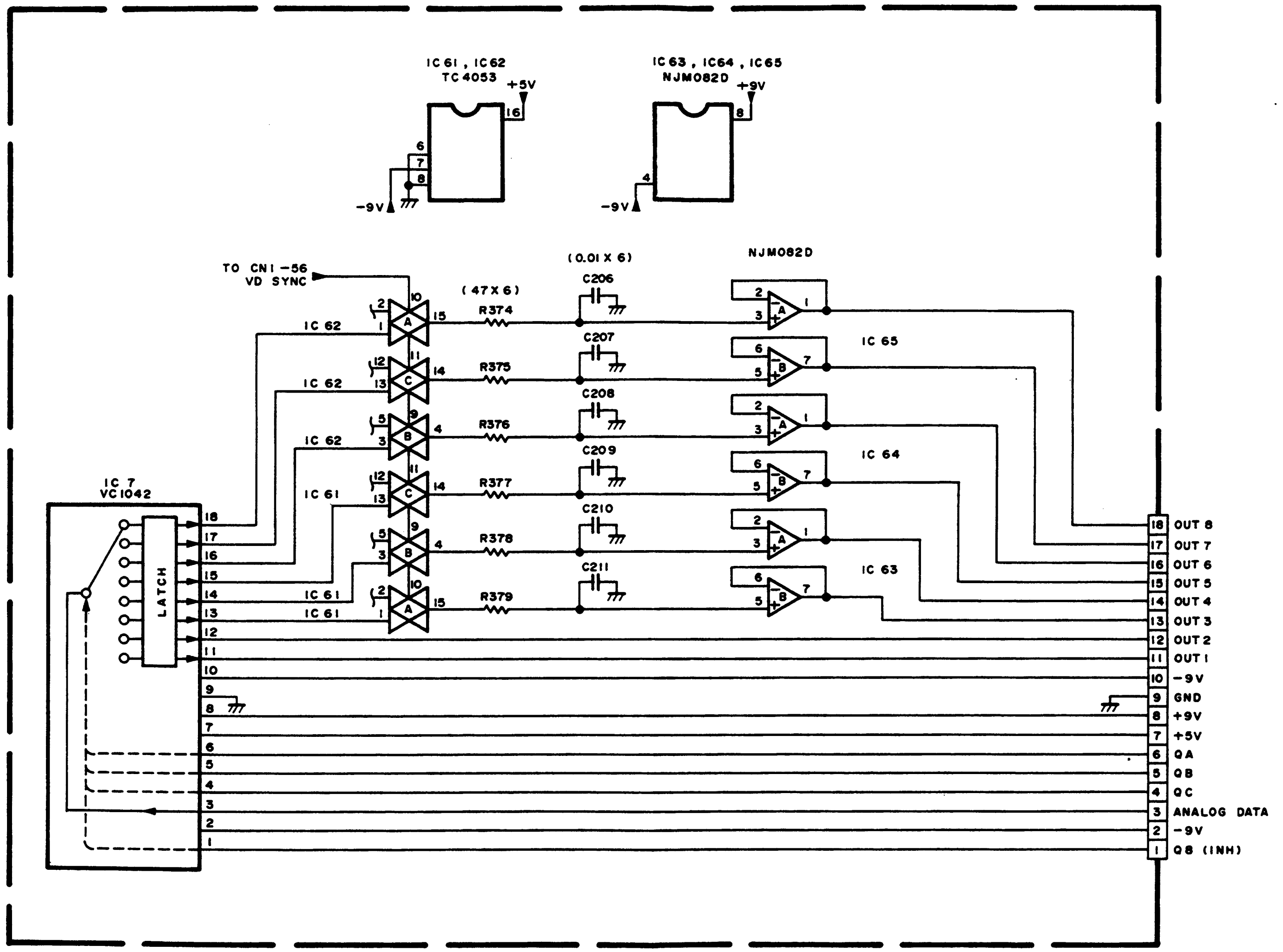
● WF board


WF BOARD A'SSY
SCK1070-00A
SSH BOARD
CN3
SCB1070-001
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
H.TRI.GAIN
H.SAW.GAIN
H.PARA GAIN
H.PARA ADJ
H.INV DC
PARA INV.DC
V.TRI.GAIN
V.SAW.GAIN
V.PARA.GAIN
V.PARA ADJ
V.INV DC
V.BORDER W
H.BORDER.W
MIX.DC
PARA BIAS
F.B GAIN
F.B BIAS
CONE BIAS
BL.DC
DSK.SLICE DC
WIPE.KEY.DC
BORDER.KEY.DC
KEY.DC
KEY.GAIN
CBM1
CBM2
CBM3
CBM5
CBM6
CBM7
CBM8
CBM9
CBM10
CBM11
CBM12
RA1
RA2
RA3
RA4

5.12 WF BOARD SCHEMATIC DIAGRAM 05

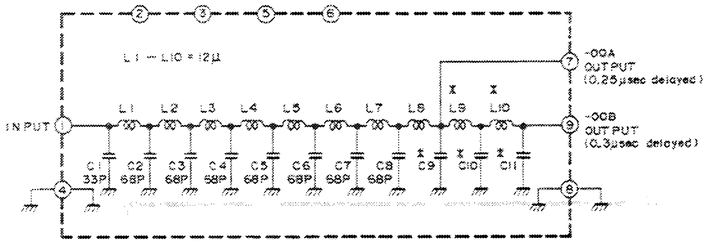

H/V mix wave, 2 V/div, V-rate
Top: H/V mix
Middle: H (extended)
Bottom: VD
H wave, 6 Vp-p, H-rate
Top: H wave
Bottom: CP
(NOMAL MODE)
V wave, 6 Vp-p, V-rate
Top: Vwave
Bottom: VD
SOFT OFF
SOFT ON
SOFT OFF
SOFT ON
TP4 9 Vp-p
TP5 7 Vp-p
H-rate
CN 3
1 +15V
2 +15V
3 +9V
4 +9V
5 +5V (Analog)
87 -9V
88 -9V
89 A. GND
90 A. GND
8 +5V (Digital)
9 +5V (Digital)
6 D GND
7 D GND
57 CHROMA KEY (CP) ON/OFF (MIX/SE)
66 CHROMA KEY (VIDEO) ON/OFF (MIX)
74 EDGE ON/OFF
75 BC/CB SW
76 BC ON/OFF
(BC)
48 Q 2
50 Q 4
45 DATA
(KSG)
55 WIPE / MIX OUT (CP)
32 BORDER KEY OUT (VIDEO)
73 DSK MATT FILL CTL (CP)
30 DSK KEY HOLE (TO VIDEO) (VIDEO)
22 DSK MATTE GATE (TO BC) (BC)
CN 3
(KSG) VD 16
(KSG) C.P 24
(BNC) RAMP 1 81
RAMP 2 82
GND 83
(VIDEO) SUPER LEVEL OUT 68
(CP) CHROMA KEY FINE 35
CHROMA KEY SLICE 38
VD SYNC 56
(BC) XO (ANALOG DATA) 63
(KSG) Q A 42
Q B 43
Q C 44
Q 8 54
C.P 53
(BC) N.BL 37
O 0 46
O 1 47
O 3 49
O 5 51
O 6 52
UNUSED
(BNC) VIDEO FOR DSK 60
WIPE / MIX SELECT
WIPE CODE
SOFTNESS CONT
BORDER ON/OFF
POLARITY
POSI ON/OFF
R316 KEY GAIN
R196 H BORDER WIDTH
R275 V BORDER WIDTH
R405 V TOP LEV
R404 H TOP LEV
R239 V PARA ADJ
R308 WIPE KEY DC
R313 BORDER KEY DC
R73 DSK SLICE DC
R281 MIX DC
R196 CONE BIAS
R203 PARA BIAS
R208 PARA INV DC
R192 FB BIAS
R190 FB GAIN
EDGE ON/OFF
IC 50 4051
IC 51 4051
AN90822
4099
CBMC4351-00A
CBMC4367-00A
CBMC4364-00A
SAME AS LEFT
SAME AS ABOVE
SAME AS CBM 9
SAME AS CBM 10
IC 32 TC4051
IC 34 TC4051
IC 3 µPD74HC10
IC 2 74HC86
IC 1 LM319
IC 5 LM319
IC 60 NJM 082D
C400 (0.0033µF) 3300pF
C401 (0.0033µF) 3300pF
IC60 TL082CP
(OP.AMP)
TP 1
TP 2
TP 3
TP 4
TP 5
TP 6
TP 7
TP 8
TP 9

- **SSH board**

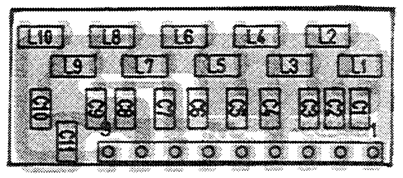

IC61, IC62
TC4053
+5V
-9V
IC63, IC64, IC65
NJM082D
+9V
-9V
TO CN1-56
VD SYNC
(47X6)
R374
R375
R376
R377
R378
R379
(0.01X6)
C206
C207
C208
C209
C210
C211
NJM082D
IC 65
IC 64
IC 63
IC 62
IC 62
IC 62
IC 61
IC 61
IC 61
IC 7
VC1042
LATCH
OUT 8
OUT 7
OUT 6
OUT 5
OUT 4
OUT 3
OUT 2
OUT 1
-9V
GND
+9V
+5V
QA
QB
QC
ANALOG DATA
-9V
Q8 (INH)

5.13 BC CIRCUIT BOARDS (NTSC/PAL) (Parts side view)

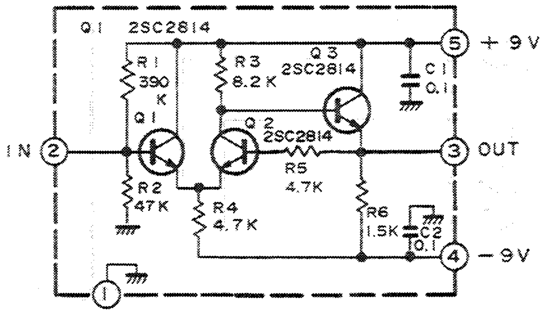
● DL-25 CBM [CBMC3436-00A] (CBM1,3)

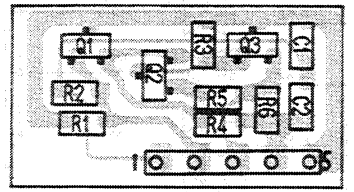

L1 ~ L10 = 12µ
INPUT
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
C1 33P
C2 68P
C3 68P
C4 58P
C5 68P
C6 68P
C7 58P
C8 68P
C9
C10
C11
-00A OUTPUT (0.25µsec delayed)
-00B OUTPUT (0.3µsec delayed)
1
2
3
4
5
6
7
8
9

※	-00A	-00B
C9	33P	58P
C10	OPEN	68P
C11	OPEN	33P
L9	OPEN	12µ
L10	OPEN	12µ

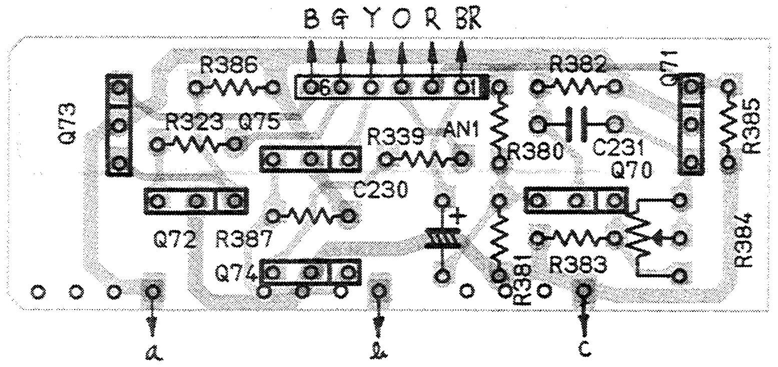

L10
L8
L6
L4
L2
L9
L7
L5
L3
L1
C10
C11
C9
C8
C7
C6
C5
C4
C3
C2
C1
1

● B.B CBM (CBMC4458-00A)(CBM1~7)

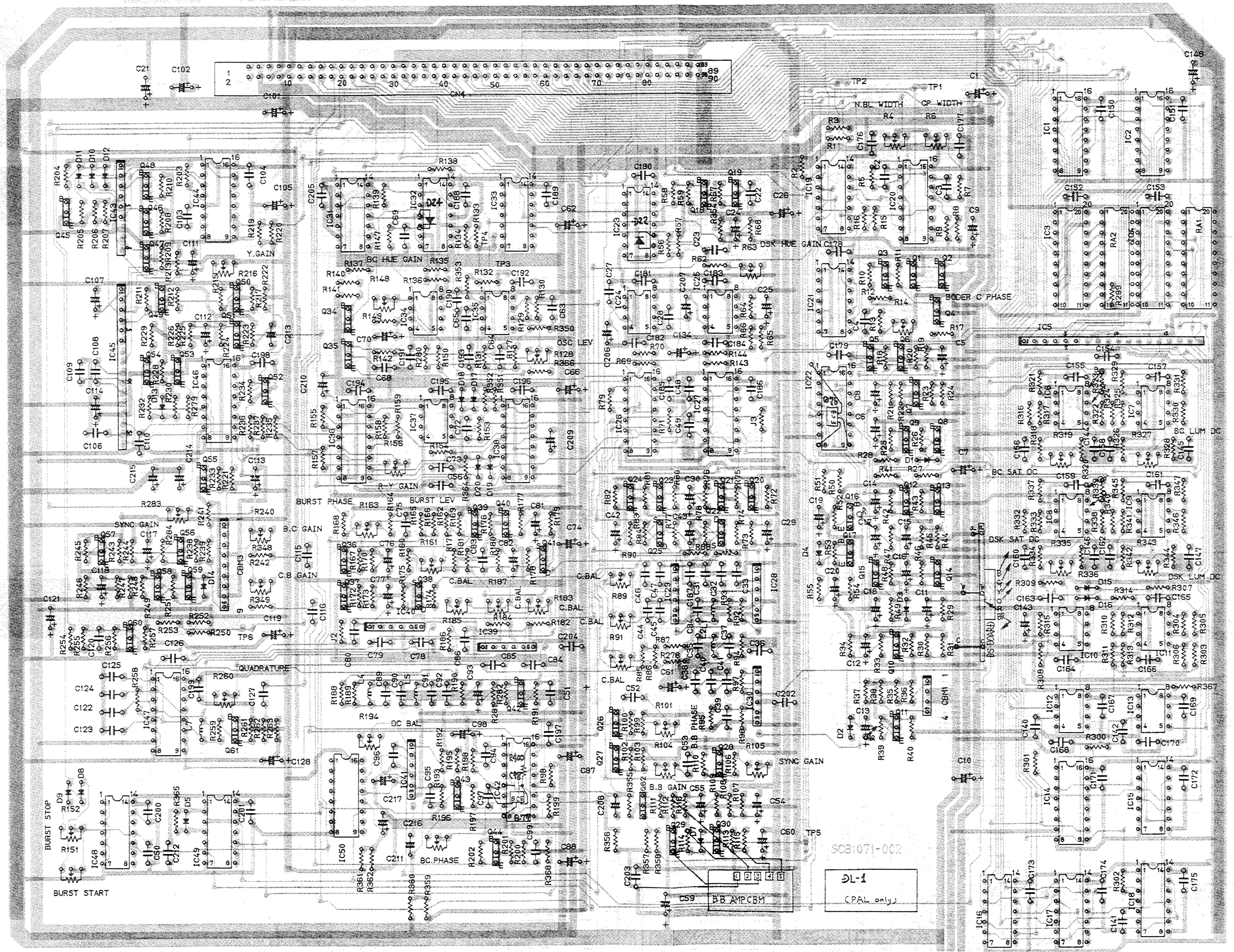

Q1 2SC2814
R1 390 K
Q1
R2 47K
R3 8.2K
Q3 2SC2814
Q2 2SC2814
R5 4.7K
R4 4.7K
R6 1.5K
C1 0.1
C2 0.1
IN 2
+9V 5
OUT 3
-9V 4
1


Q1
Q2
Q3
R3
C1
R2
R1
R5
R4
R6
C2
1
5

● DS board (Not available on the -003 BC board and after)

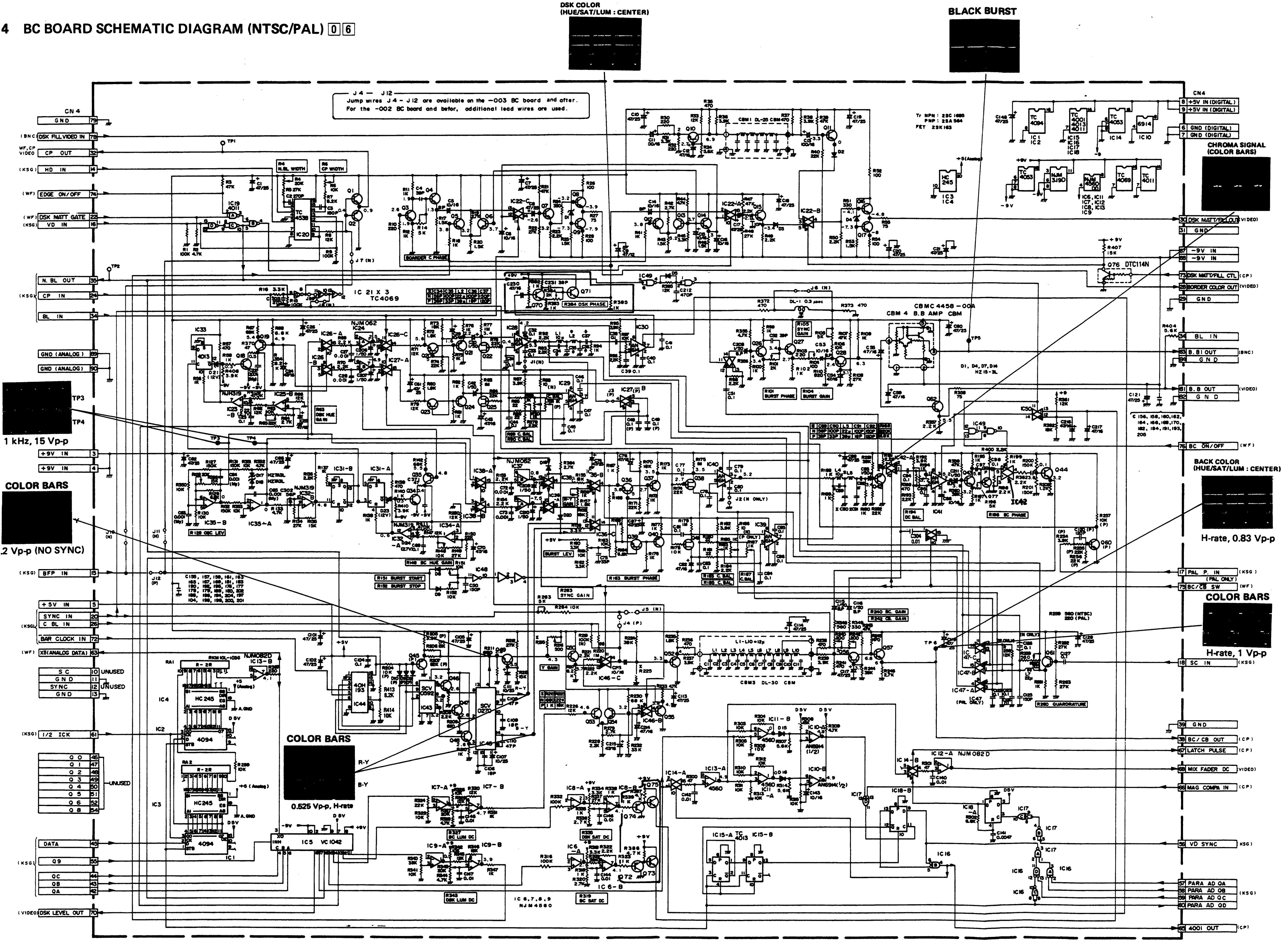

B G Y O R BR
R386
6
1
R382
Q71
Q73
R323
Q75
R339
AN1
R380
C231
R385
Q70
C230
Q72
R387
Q74
R381
R383
R384
a
b
c

● BC board


CN4
TP1
TP2
TP3
TP4
TP5
TP6
N.BL WIDTH
CP WIDTH
Y.GAIN
BC HUE GAIN
OSC LEV
DSK HUE GAIN
BODER C PHASE
BC LUM DC
BC SAT DC
DSK SAT DC
DSK LUM DC
SYNC GAIN
B.C GAIN
C.B GAIN
BURST PHASE
BURST LEV
R-Y GAIN
C.BAL
QUADRATURE
DC BAL
B.B PHASE
B.B GAIN
B.B AMPCBM
BC.PHASE
BURST STOP
BURST START
DS BOARD
CBM1
CBM3
SCB1071-002
DL-1
(PAL only)

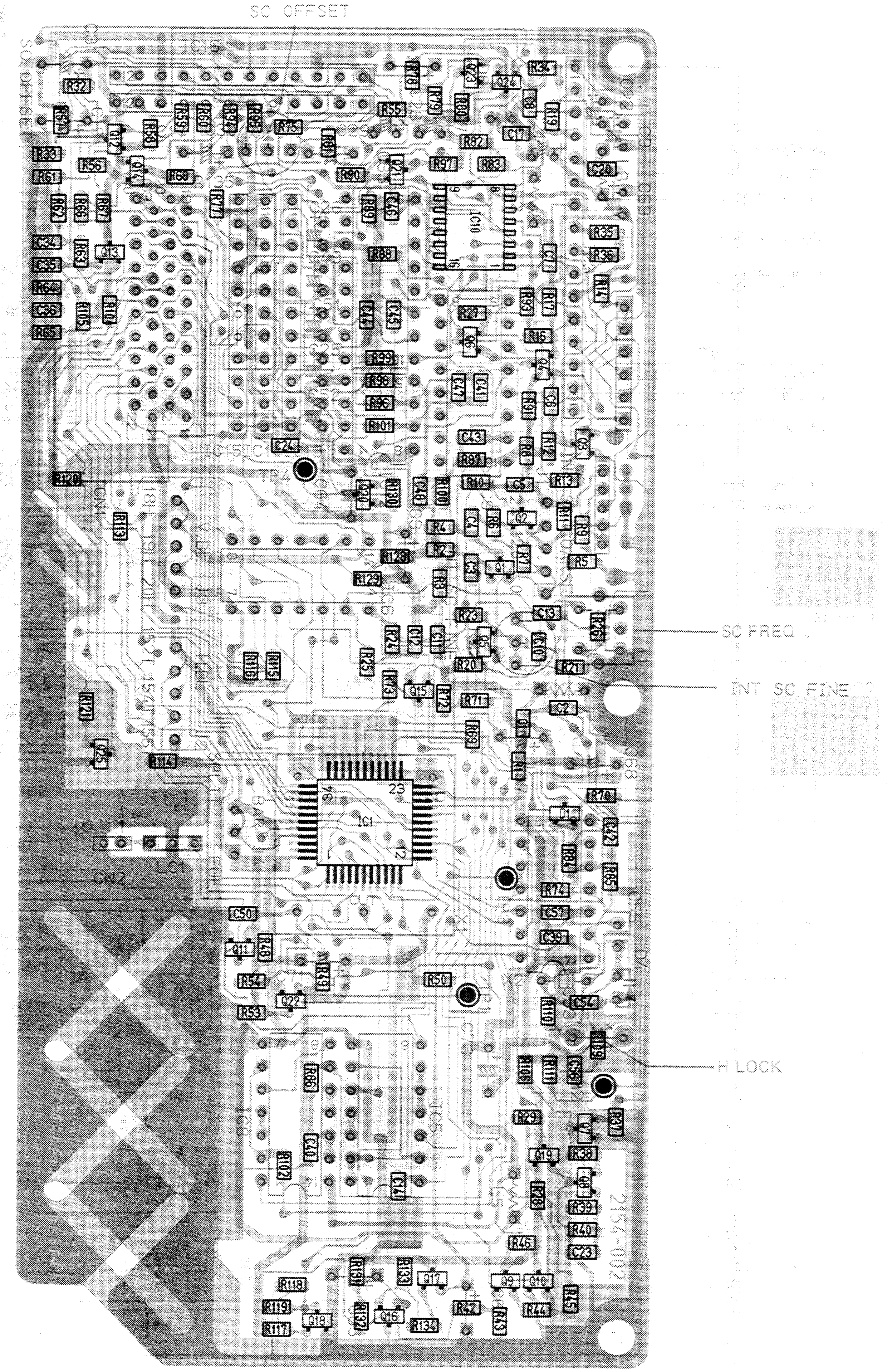
SCK1071-N0A-P0A
BC BOARD ASS'Y

5.14 BC BOARD SCHEMATIC DIAGRAM (NTSC/PAL) 06

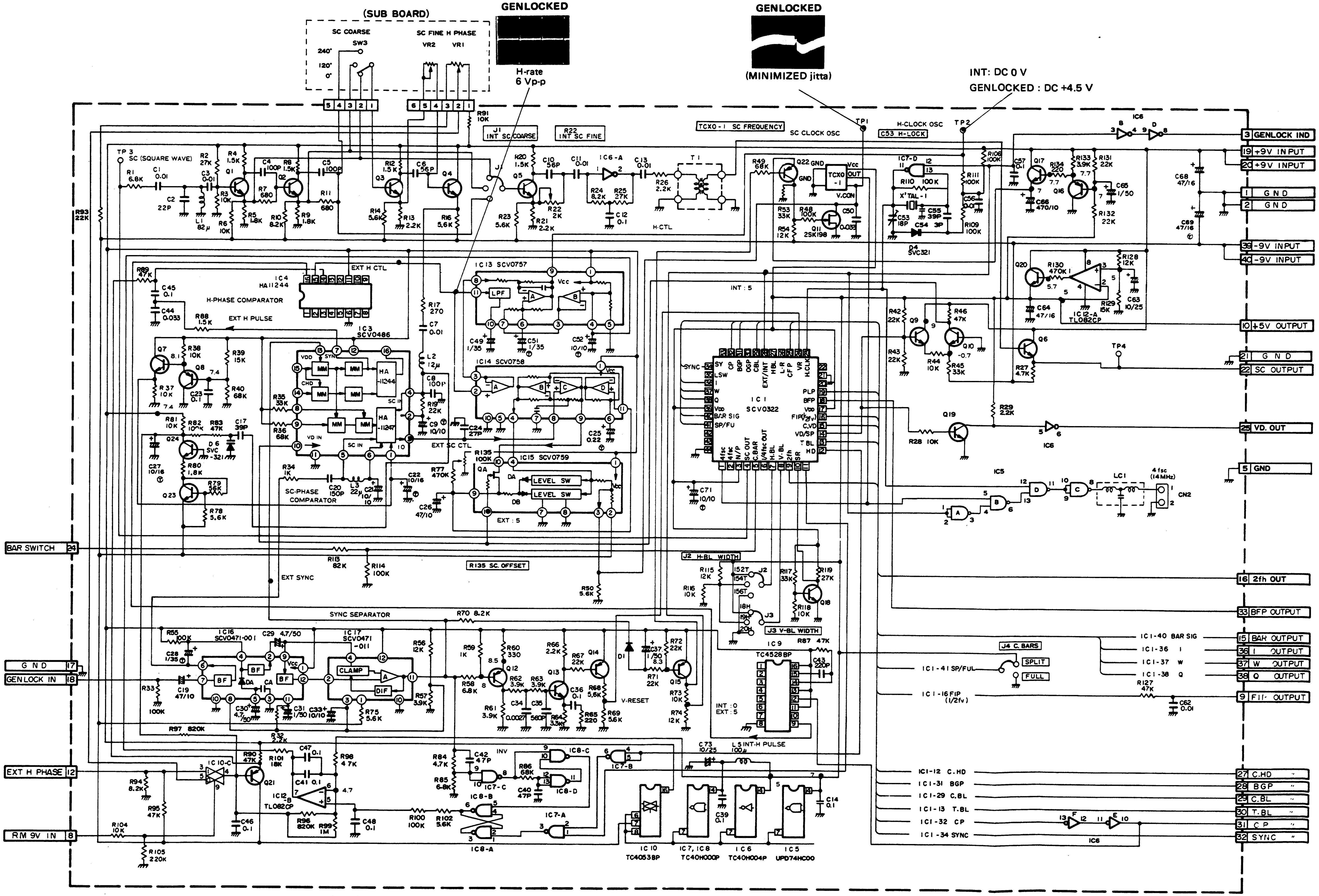

DSK COLOR (HUE/SAT/LUM : CENTER)
BLACK BURST
J4 – J12
Jump wires J4 – J12 are available on the -003 BC board and after.
For the -002 BC board and befor, additional lead wires are used.
CN 4
GND 79
(BNC) DSK FILL VIDEO IN 78
WF, CP VIDEO CP OUT 32
(KSG) HD IN 14
(WF) EDGE ON/OFF 74
(WF) DSK MATT GATE 22
(KSG) VD IN 16
N. BL OUT 35
(KSG) CP IN 24
BL IN 34
GND (ANALOG) 89
GND (ANALOG) 90
TP3
TP4
1 kHz, 15 Vp-p
+9V IN 3
+9V IN 4
COLOR BARS
1.2 Vp-p (NO SYNC)
(KSG) BFP IN 15
+5V IN 5
SYNC IN 20
(KSG) C BL IN 26
BAR CLOCK IN 72
(WF) X8(ANALOG DATA) 63
S C 10 UNUSED
G N D 11
SYNC 12 UNUSED
G N D 13
(KSG) 1/2 ICK 61
Q 0 46
Q 1 47
Q 2 48
Q 3 49
Q 4 50
Q 5 51
Q 6 52
Q 8 54
UNUSED
DATA 45
(KSG) Q9 55
QC 44
QB 43
QA 42
(VIDEO) DSK LEVEL OUT 70
IC 21 X 3 TC4069
CBMC 4458 - 00A
CBM 4 B.B AMP CBM
Tr NPN : 2SC 1685
PNP : 2SA 564
FET 2SK163
COLOR BARS
R-Y
B-Y
0.525 Vp-p, H-rate
IC5 VC1042
CN4
8 +5V IN (DIGITAL)
9 +5V IN (DIGITAL)
6 GND (DIGITAL)
7 GND (DIGITAL)
CHROMA SIGNAL (COLOR BARS)
30 DSK MATT/FILL OUT (VIDEO)
31 GND
87 -9V IN
88 -9V IN
Q76 DTC114N
73 DSK MATT/FILL CTL (CP)
28 BORDER COLOR OUT (VIDEO)
29 GND
34 BL IN
83 B.B1 OUT (BNC)
84 GND
81 B.B OUT (VIDEO)
82 GND
76 BC ON/OFF (WF)
BACK COLOR (HUE/SAT/LUM : CENTER)
H-rate, 0.83 Vp-p
17 PAL P. IN (KSG) (PAL ONLY)
75 BC/CB SW (WF)
COLOR BARS
H-rate, 1 Vp-p
18 SC IN (KSG)
39 GND
38 BC/CB OUT (CP)
67 LATCH PULSE (CP)
68 MIX FADER DC (VIDEO)
66 MAG COMPA IN (CP)
56 VD SYNC (KSG)
57 PARA AD QA
58 PARA AD QB (KSG)
59 PARA AD QC
60 PARA AD QD
65 4001 OUT (CP)

: DS BOARD

5.15-N SG CIRCUIT BOARD (NTSC) (Soldered side) 0 7

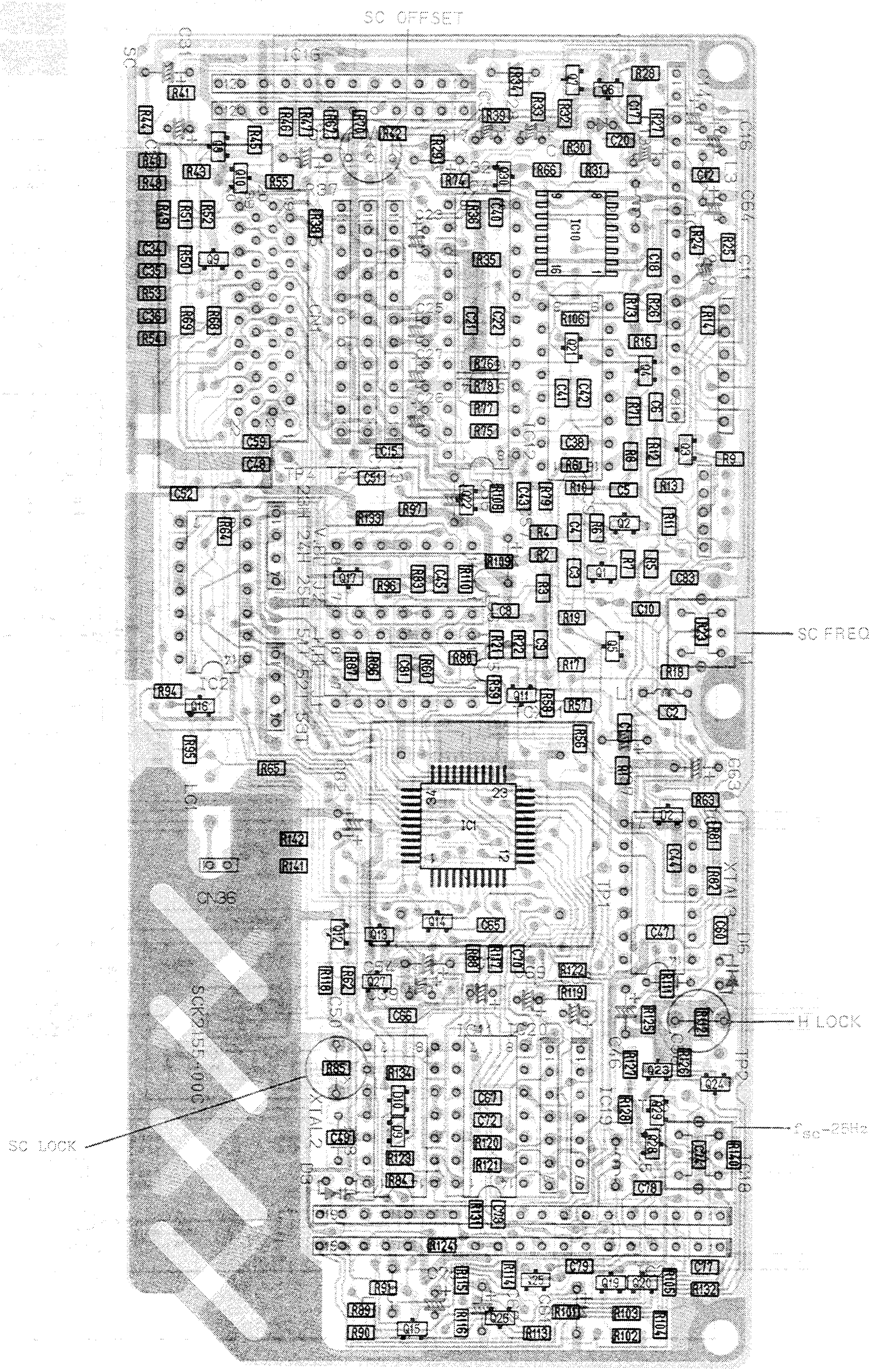

SC OFFSET
SC FREQ
INT SC FINE
H LOCK
IC1
CN1
CN2
LC1

5.16-N SG BOARD SCHEMATIC DIAGRAM (NTSC) 0 6

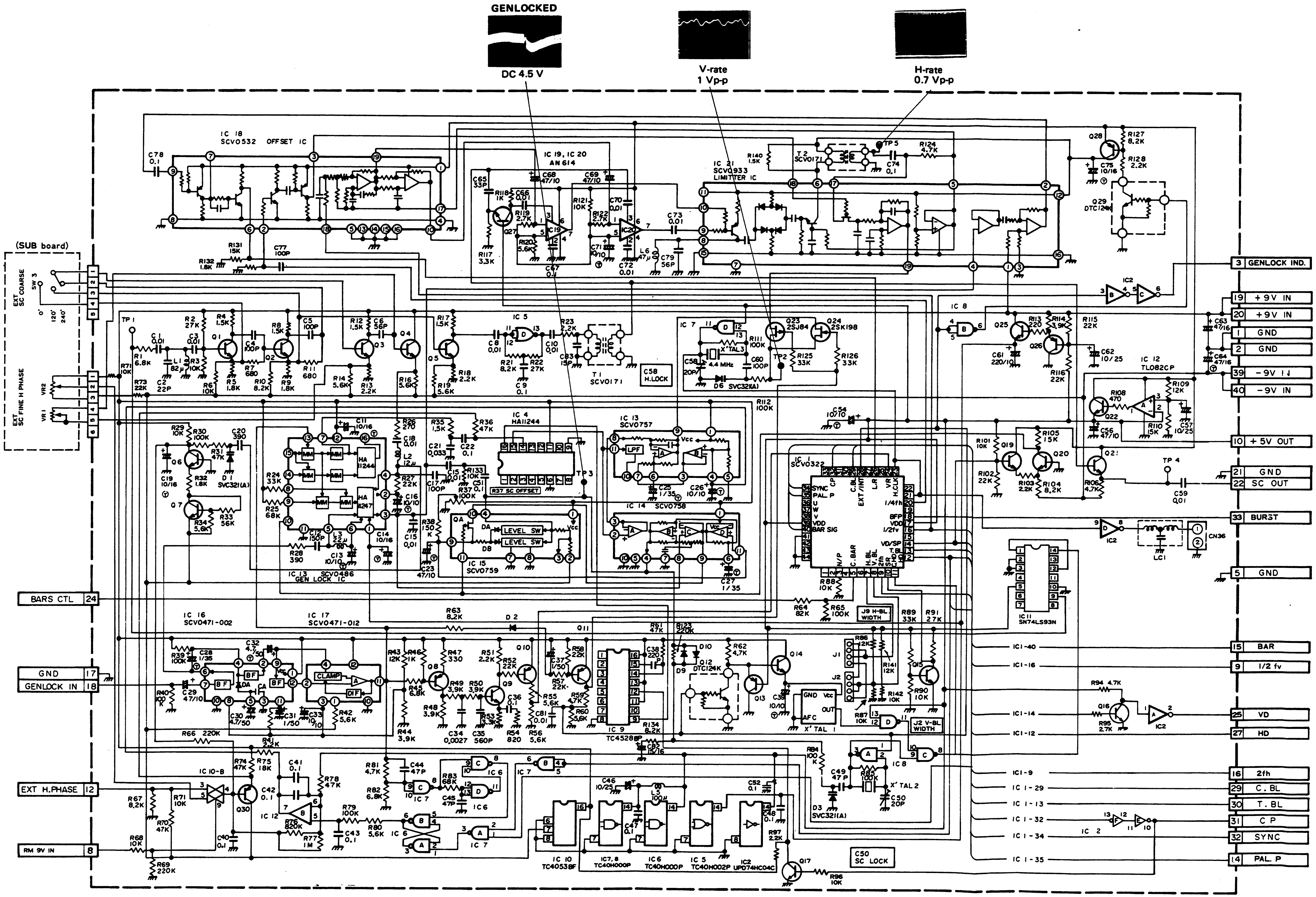

(SUB BOARD)
SC COARSE
SW3
240°
120°
0°
SC FINE H PHASE
VR2
VR1
GENLOCKED
H-rate
6 Vp-p
GENLOCKED
(MINIMIZED jitta)
INT: DC 0 V
GENLOCKED : DC +4.5 V
TP 3
SC (SQUARE WAVE)
J1 INT SC COARSE
R22 INT SC FINE
TCXO-1 SC FREQUENCY
SC CLOCK OSC
TP1
H-CLOCK OSC
C53 H-LOCK
TP2
IC6
IC4 HA11244
H-PHASE COMPARATOR
EXT H CTL
EXT H PULSE
IC3 SCV0486
IC13 SCV0757
IC14 SCV0758
IC15 SCV0759
SC-PHASE COMPARATOR
EXT SC CTL
LEVEL SW
EXT : 5
INT : 5
IC1 SCV0322
IC12-A TL082CP
IC5
LC1
4 fsc (14MHz)
CN2
R135 SC. OFFSET
EXT SYNC
J2 H-BL WIDTH
J3 V-BL WIDTH
SYNC SEPARATOR
IC16 SCV0471-001
IC17 SCV0471-011
CLAMP
DIF
V-RESET
IC9 TC4528BP
INT : 0
EXT : 5
J4 C. BARS
SPLIT
FULL
IC1-41 SP/FUL
IC1-16 FIP (1/2fv)
IC1-40 BAR SIG
IC1-36 I
IC1-37 W
IC1-38 Q
L5 INT-H PULSE
IC12-B TL082CP
IC8-A
IC8-B
IC8-C
IC8-D
IC7-A
IC7-B
IC7-C
IC10-C
IC1-12 C.HD
IC1-31 BGP
IC1-29 C.BL
IC1-13 T.BL
IC1-32 CP
IC1-34 SYNC
IC10 TC4053BP
IC7, IC8 TC40H000P
IC6 TC40H004P
IC5 UPD74HC00
3 GENLOCK IND
19 +9V INPUT
20 +9V INPUT
1 GND
2 GND
39 -9V INPUT
40 -9V INPUT
10 +5V OUTPUT
21 GND
22 SC OUTPUT
25 VD. OUT
5 GND
16 2fh OUT
33 BFP OUTPUT
15 BAR OUTPUT
36 I OUTPUT
37 W OUTPUT
38 Q OUTPUT
9 FII- OUTPUT
27 C.HD
28 BGP
29 C.BL
30 T.BL
31 C P
32 SYNC
24 BAR SWITCH
17 GND
18 GEN LOCK IN
12 EXT H PHASE
8 RM 9V IN

5-17-N 5-17-N

5.15-P SG CIRCUIT BOARD (PAL) (Soldered side)


SC OFFSET
SC FREQ
H LOCK
f_{sc}-25Hz
SC LOCK
IC1
IC10
CN36
XTAL 2
TP1
TP2
TP4

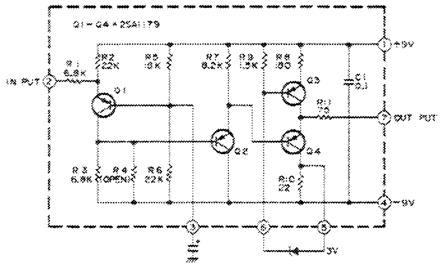
5.16-P SG BOARD SCHEMATIC DIAGRAM (PAL) [0][7]

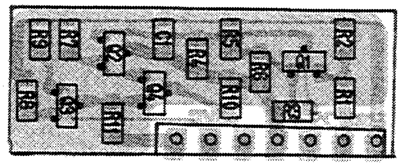

GENLOCKED
DC 4.5 V
V-rate
1 Vp-p
H-rate
0.7 Vp-p
IC 18 SCV0532 OFFSET IC
IC 19, IC 20 AN614
IC 21 SCV0933 LIMITTER IC
T2 SCV0171
TP5
(SUB board)
EXT SC COARSE
SW 3
0° 120° 240°
EXT SC FINE H PHASE
VR2
VR1
TP 1
IC 5
T1 SCV0171
C58 H.LOCK
IC 7
X'TAL 3 4.4 MHz
D6 SVC321(A)
TP2
Q23 2SJ84
Q24 2SK198
IC 8
IC 12 TL082CP
IC 4 HA11244
IC 13 SCV0757
IC 14 SCV0758
IC 15 SCV0759
LEVEL SW
R37 SC OFFSET
TP 3
D1 SVC321(A)
IC 13 SCV0486 GEN LOCK IC
IC 1 SCV0322
TP 4
CN36
LC1
IC 11 SN74LS93N
J9 H-BL WIDTH
J2 V-BL WIDTH
IC 16 SCV0471-002
IC 17 SCV0471-012
CLAMP
DIF
IC 9 TC4528BP
D10
Q12 DTC124K
X'TAL 1
X'TAL 2
D3 SVC321(A)
IC 10 TC4053BF
IC7, 8 TC40H000P
IC6 TC40H000P
IC 5 TC40H002P
IC2 UPD74HC04C
C50 SC LOCK
BARS CTL 24
GND 17
GENLOCK IN 18
EXT H.PHASE 12
RM 9V IN 8
3 GENLOCK IND.
19 +9V IN
20 +9V IN
1 GND
2 GND
39 -9V IN
40 -9V IN
10 +5V OUT
21 GND
22 SC OUT
33 BURST
5 GND
15 BAR
9 1/2 fv
25 VD
27 HD
16 2fh
29 C.BL
30 T.BL
31 CP
32 SYNC
14 PAL. P
IC1-40
IC1-16
IC1-14
IC1-12
IC1-9
IC 1-29
IC 1-13
IC 1-32
IC 1-34
IC 1-35

5-17-P 5-17-P

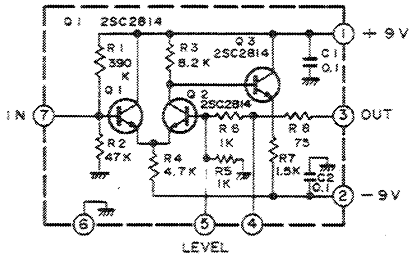
5.17 KSG CIRCUIT BOARDS (Parts side view)

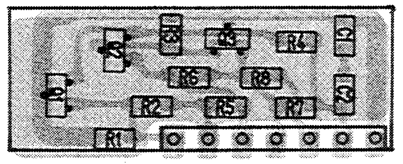
● PULSE AMP CBM [CBMC4374-00A](CBM1-9)


Q1 ~ Q4 × 2SA1179
IN PUT
R1
6.8K
R2
22K
R5
18K
R7
8.2K
R9
1.5K
R8
180
Q1
Q2
Q3
Q4
C1
0.1
R11
75
OUT PUT
+9V
-9V
R3
6.8K
R4
OPEN
R6
22K
R10
22
3V
1
2
3
4
5
6
7

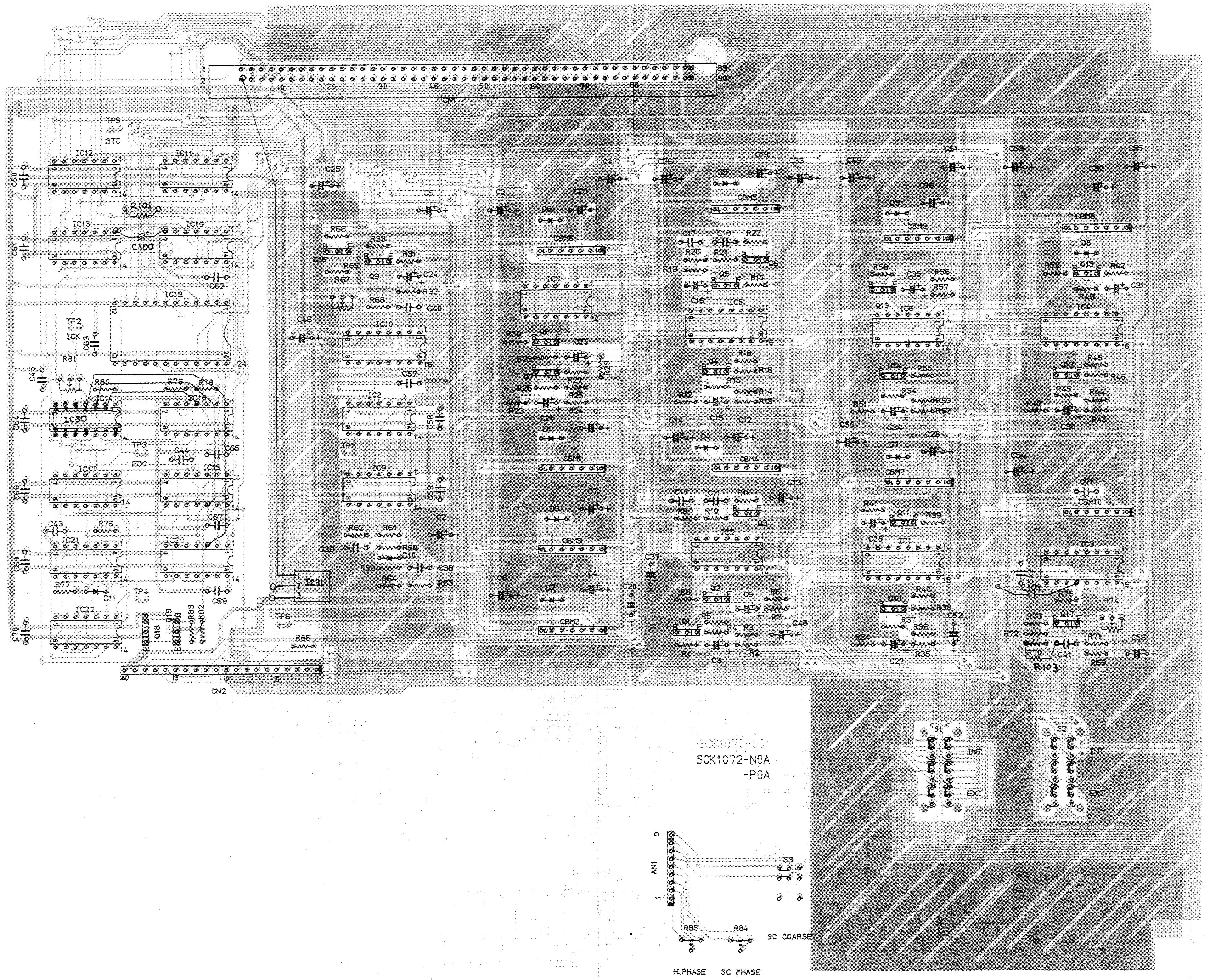

Q1
R1
R2
R4
R10

● VIDEO AMP CBM [CBCM4396-00A](CBM10) [CBMC4396-00A]

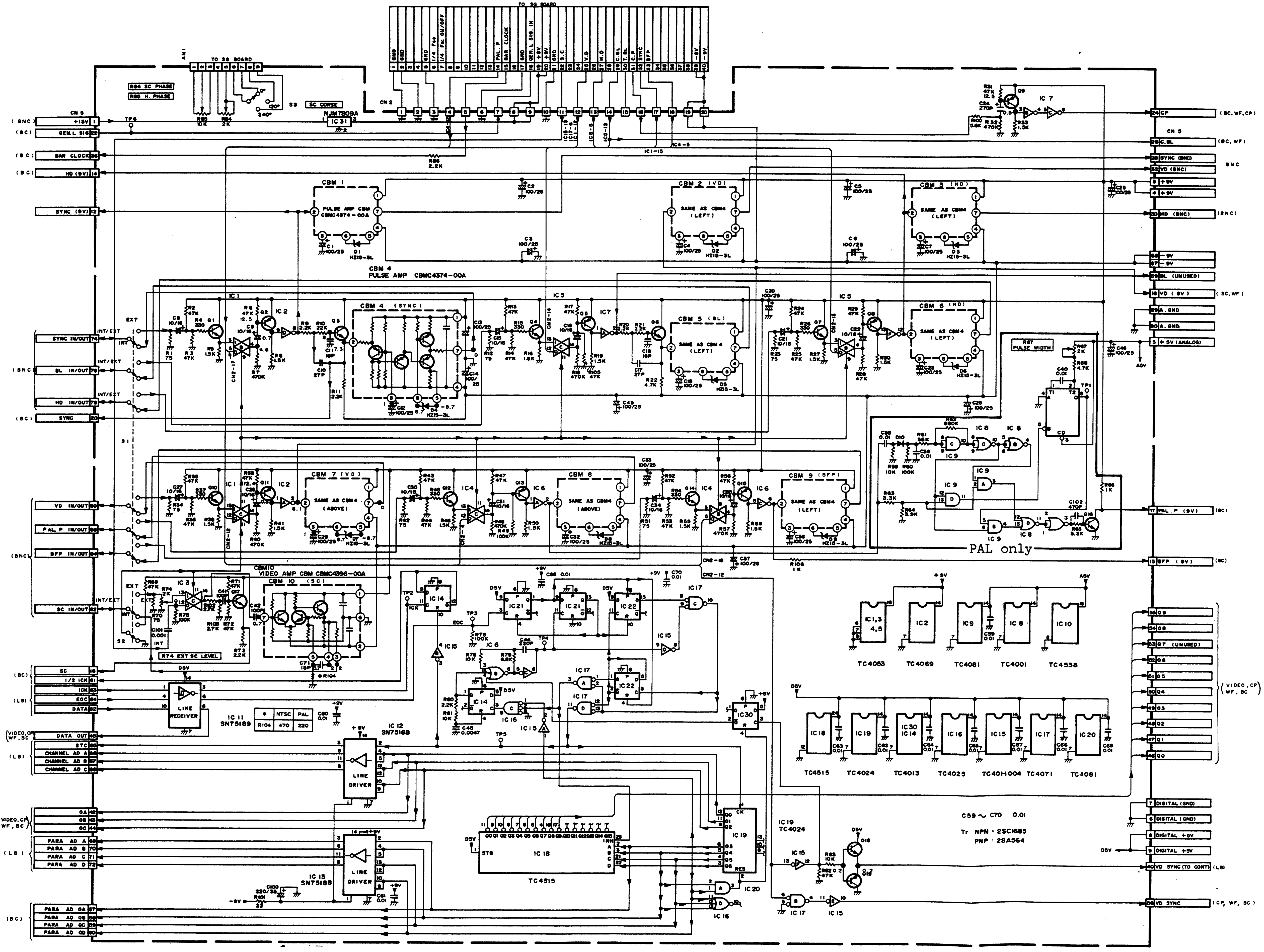

Q1 2SC2814
R1
390
K
Q1
R3
8.2K
Q3
2SC2814
C1
0.1
+9V
IN
7
Q2
2SC2814
R6
1K
R8
75
3
OUT
R2
47K
R4
4.7K
R5
1K
R7
1.5K
C2
0.1
2
-9V
6
5
4
LEVEL
1


Q1
R3
Q3
R4
C1
R6
R8
R2
R5
R7
C2
R1

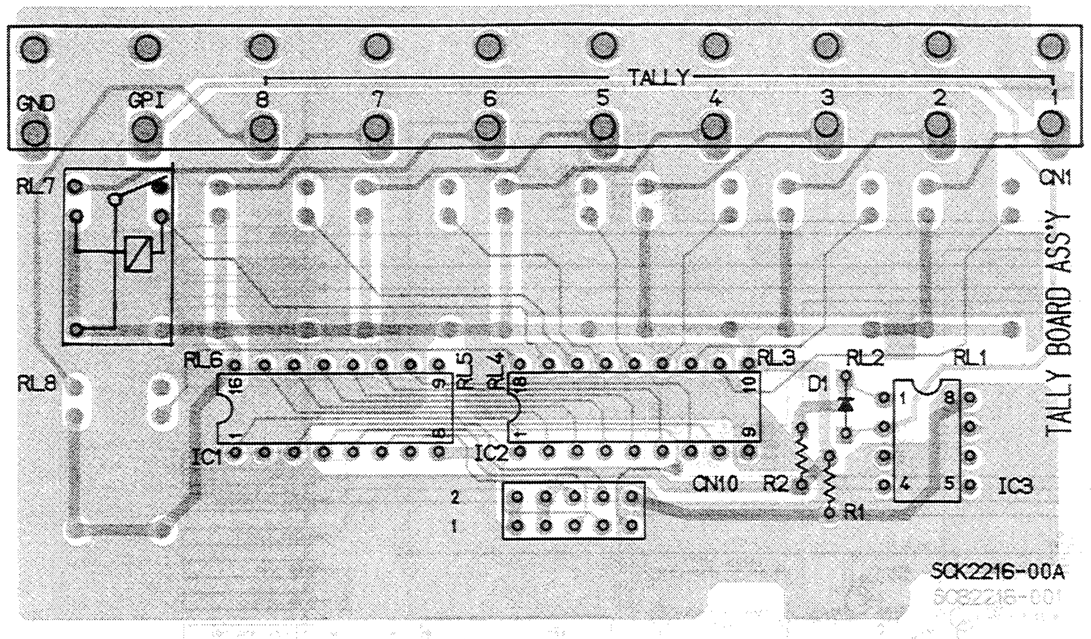
- **KSG board**


CN1
CN2
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC19
IC20
IC21
IC22
IC30
IC31
TP1
TP2
TP3
TP4
TP5
TP6
STC
ICK
EOC
C100
R101
R103
S1
S2
S3
INT
EXT
ANI
R85
R84
H.PHASE
SC PHASE
SC COARSE
SCS1072-001
SCK1072-N0A
-P0A

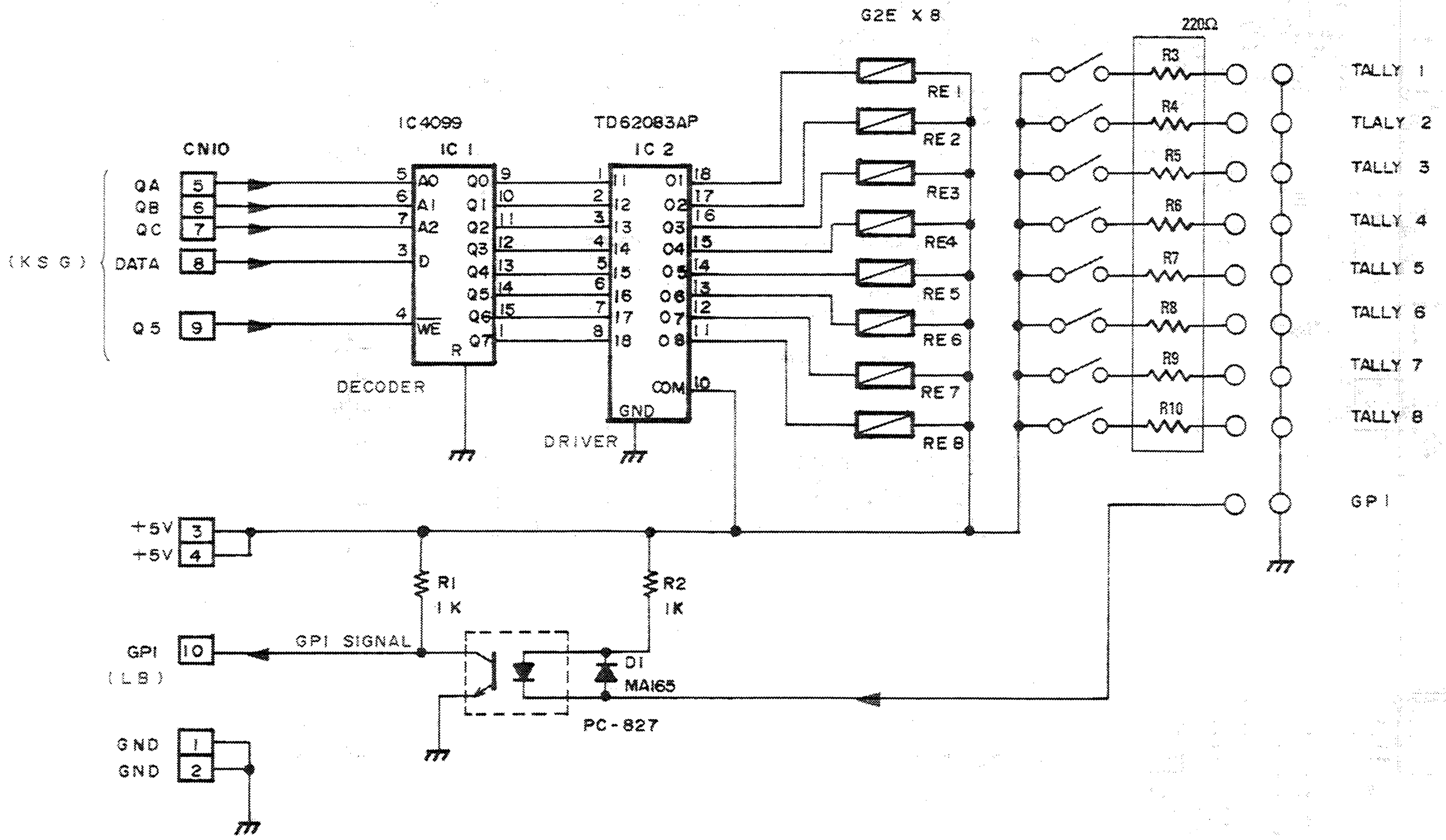
5.18 KSG BOARD SCHEMATIC DIAGRAM 0 8


TO SG BOARD
CN 2
CN 5
CN 6
R64 SC PHASE
R65 H. PHASE
SC CORSE
S3
NJM7809A
IC 31
+15V
GEN.L SIG
BAR CLOCK
HD (9V)
SYNC (9V)
CBM 1
PULSE AMP CBM
CBMC4374-00A
CBM 2 (VD)
CBM 3 (HD)
SAME AS CBM4
(LEFT)
CBM 4
PULSE AMP CBMC4374-00A
CBM 4 (SYNC)
CBM 5 (BL)
CBM 6 (HD)
CBM 7 (VD)
CBM 8
CBM 9 (BFP)
(ABOVE)
CBM10
VIDEO AMP CBM CBMC4396-00A
CBM 10 (SC)
SYNC IN/OUT
BL IN/OUT
HD IN/OUT
SYNC
VD IN/OUT
PAL P IN/OUT
BFP IN/OUT
SC IN/OUT
INT/EXT
EXT
INT
S1
S2
R74 EXT SC LEVEL
R67 PULSE WIDTH
PAL only
SC
1/2 ICK
ICK
EOC
DATA
DATA OUT
STC
CHANNEL AD A
CHANNEL AD B
CHANNEL AD C
QA
QB
QC
PARA AD A
PARA AD B
PARA AD C
PARA AD D
PARA AD QA
PARA AD QB
PARA AD QC
PARA AD QD
LINE RECEIVER
LINE DRIVER
IC 11
SN75189
IC 12
SN75188
IC 13
SN75188
NTSC
PAL
R104
470
220
IC 18
TC4515
IC 19
TC4024
TC4053
TC4069
TC4081
TC4001
TC4538
TC4024
TC4013
TC4025
TC40H004
TC4071
IC1,3,4,5
IC2
IC9
IC8
IC10
IC18
IC19
IC30
IC14
IC16
IC15
IC17
IC20
C59 ~ C70 0.01
Tr NPN : 2SC1685
PNP : 2SA564
CP
C.BL
SYNC (BNC)
VD (BNC)
+9V
HD (BNC)
-9V
BL (UNUSED)
VD (9V)
A. GND
+5V (ANALOG)
PAL. P (9V)
BFP (9V)
O9
O8
O7 (UNUSED)
O6
O5
O4
O3
O2
O1
O0
DIGITAL (GND)
DIGITAL +5V
VD SYNC (TO CONT)
VD SYNC
(BC, WF, CP)
(BC, WF)
BNC
(BNC)
(BC)
(LB)
(VIDEO, CP, WF, BC)
(CP, WF, BC)
D5V
A5V
TP1
TP2
TP3
TP4
TP5
TP6

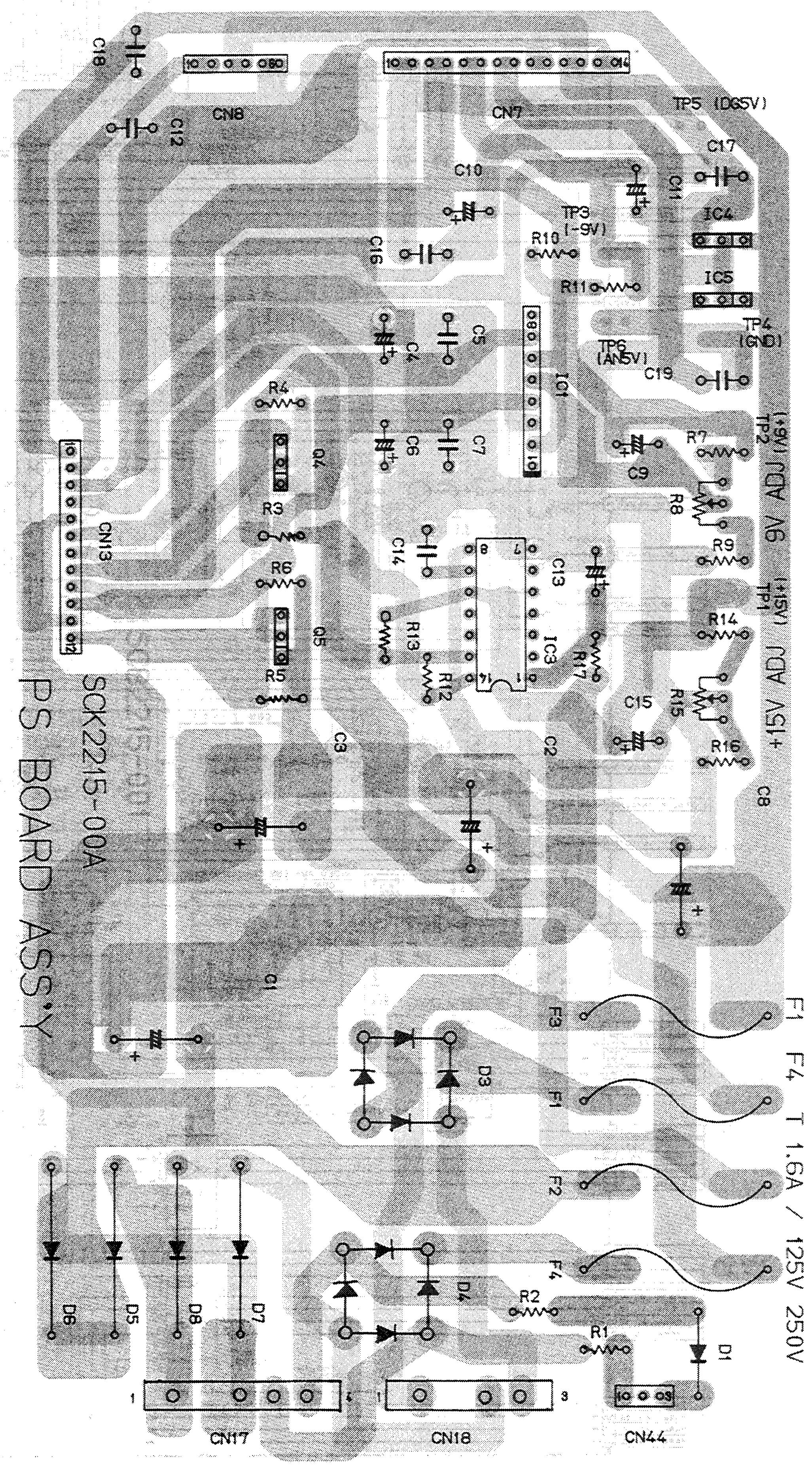
5.19 TL CIRCUIT BOARD (Parts side view)


GND
GPI
TALLY
8
7
6
5
4
3
2
1
CN1
RL7
RL8
RL6
RL5
RL4
RL3
RL2
RL1
D1
IC1
IC2
IC3
CN10
R2
R1
TALLY BOARD ASS'Y
SCK2216-00A

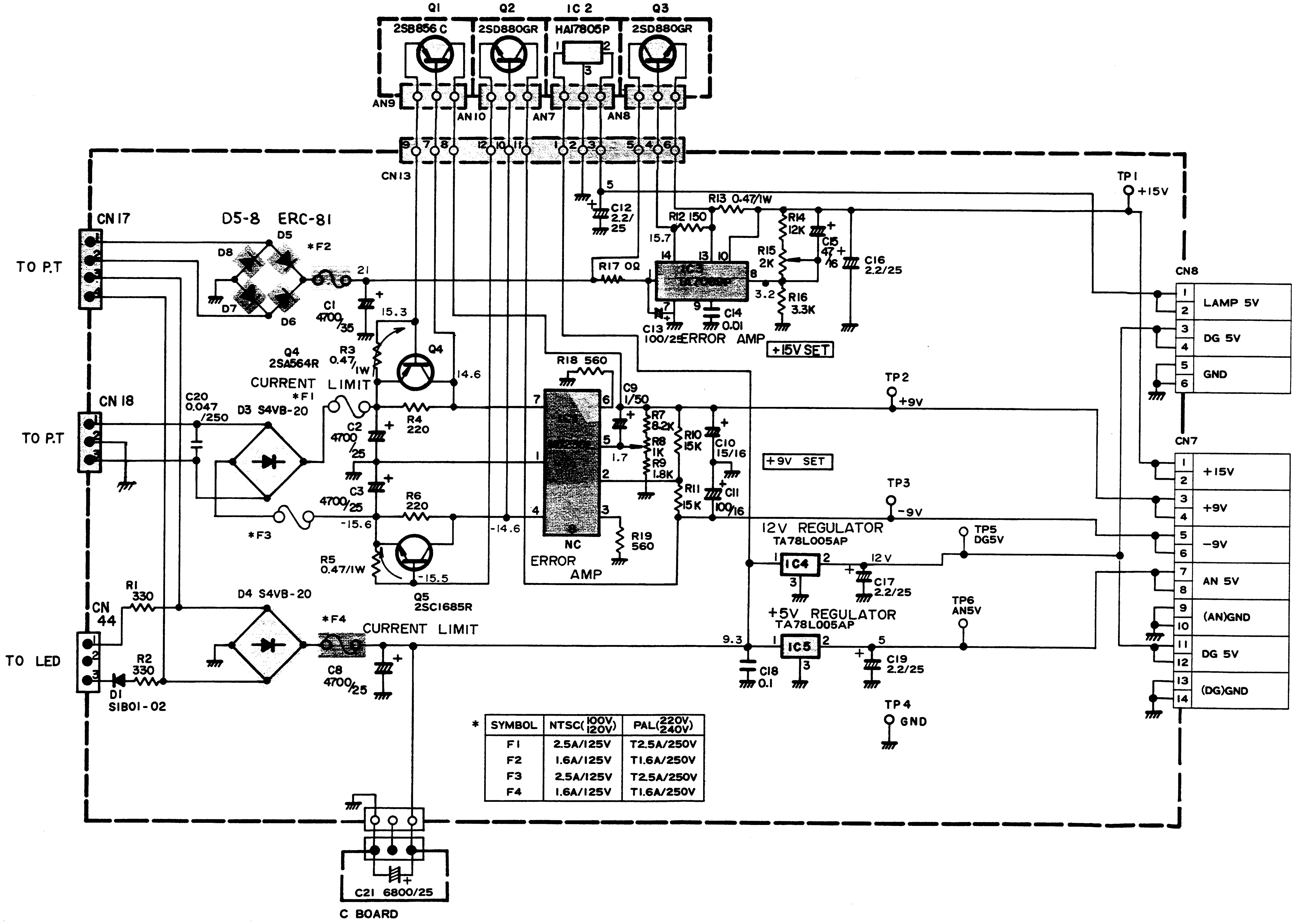
5.20 TL BOARD SCHEMATIC DIAGRAM 0 9


G2E X 8
220Ω
CN10
IC4099
IC 1
TD62083AP
IC 2
QA
QB
QC
(KSG)
DATA
Q5
A0
A1
A2
D
WE
R
DECODER
DRIVER
COM
GND
RE 1
RE 2
RE3
RE4
RE 5
RE 6
RE 7
RE 8
R3
R4
R5
R6
R7
R8
R9
R10
TALLY 1
TLALY 2
TALLY 3
TALLY 4
TALLY 5
TALLY 6
TALLY 7
TALLY 8
GPI
+5V
+5V
R1
1K
R2
1K
GPI
(LB)
GPI SIGNAL
D1
MA165
PC-827
GND
GND

5.21 PS CIRCUIT BOARD


C18
CN8
CN7
TP5 (DG5V)
C12
C10
C11
C17
TP3 (-9V)
R10
IC4
C16
R11
IC5
C4
C5
IC1
TP4 (GND)
TP6 (AN5V)
C19
R4
Q4
C6
C7
C9
R7
TP2 (+9V)
CN13
R3
R8
9V ADJ
R6
C14
C13
R9
R13
IC3
TP1 (+15V)
Q5
R12
R17
R14
R5
C15
R15
+15V ADJ
C3
C2
R16
C8
PS BOARD ASS'Y
SCK2215-00A
C1
F3
F1
F4
F2
D3
D4
F1 F4 T 1.6A / 125V 250V
D6
D5
D8
D7
R2
R1
D1
CN17
CN18
CN44

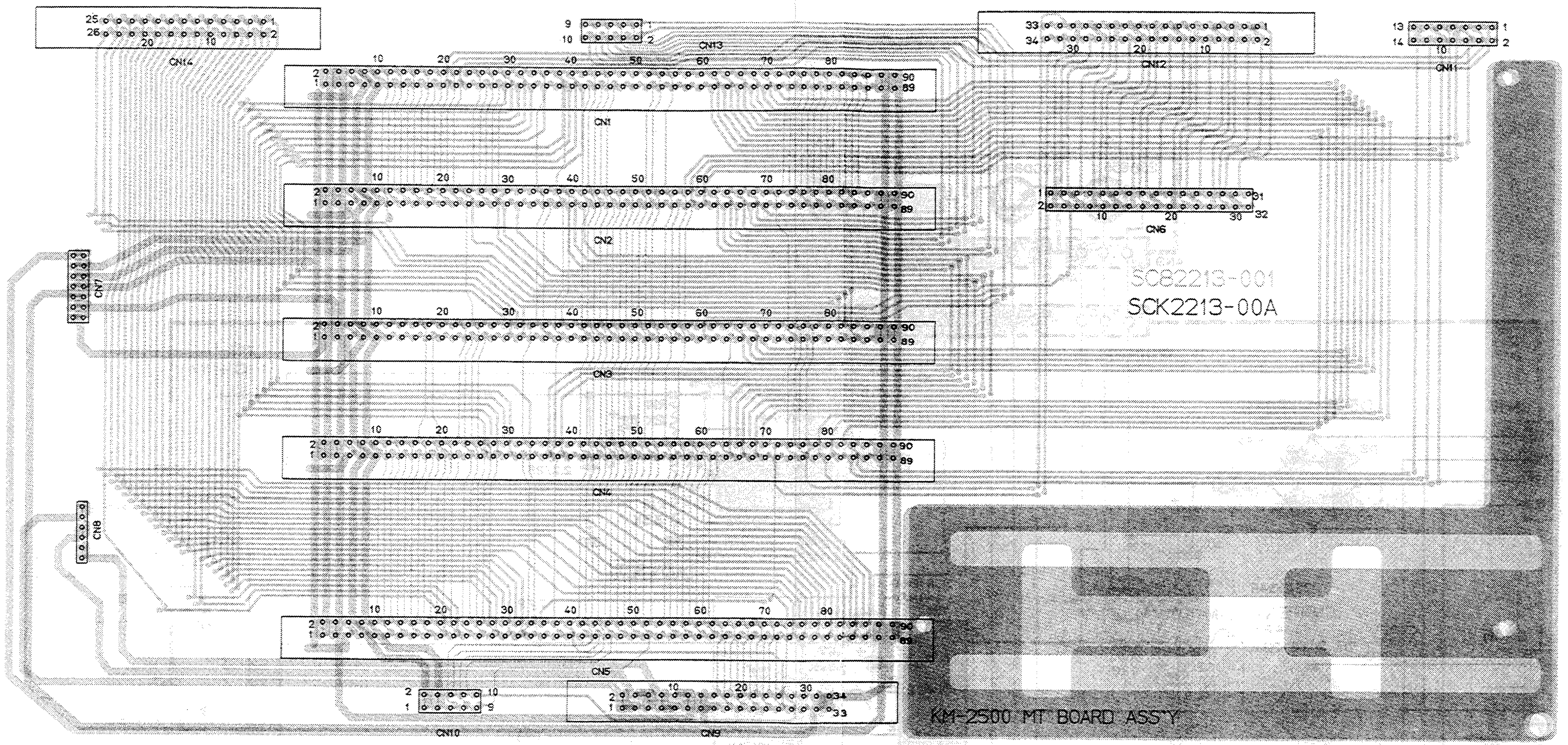
5.22 PS BOARD SCHEMATIC DIAGRAM 1 0


Q1
2SB856 C
Q2
2SD880GR
IC 2
HA17805P
Q3
2SD880GR
AN9
AN10
AN7
AN8
CN13
TP1
+15V
CN17
TO P.T
D5-8 ERC-81
D5
D8
D7
D6
*F2
21
C1
4700/35
15.3
Q4
2SA564R
R3
0.47/1W
CURRENT LIMIT
14.6
*F1
CN 18
TO P.T
C20
0.047/250
D3 S4VB-20
C2
4700/25
R4
220
C3
4700/25
R6
220
-15.6
-14.6
*F3
R5
0.47/1W
-15.5
Q5
2SC1685R
CN 44
TO LED
R1
330
R2
330
D1
S1B01-02
D4 S4VB-20
*F4
CURRENT LIMIT
C8
4700/25
C12
2.2/25
5
R13 0.47/1W
R12 150
15.7
R14
12K
C15
47/16
R15
2K
C16
2.2/25
R17 0Ω
IC3
8
3.2
R16
3.3K
C13
100/25
C14
0.01
ERROR AMP
+15V SET
R18 560
C9
1/50
R7
8.2K
R8
1K
R9
1.8K
1.7
R10
15K
C10
15/16
R11
15K
C11
100/16
R19
560
NC
ERROR AMP
TP2
+9V
+9V SET
TP3
-9V
12V REGULATOR
TA78L005AP
IC4
12V
C17
2.2/25
TP5
DG5V
+5V REGULATOR
TA78L005AP
IC5
9.3
C18
0.1
C19
2.2/25
TP6
AN5V
TP4
GND
CN8
LAMP 5V
DG 5V
GND
CN7
+15V
+9V
-9V
AN 5V
(AN)GND
DG 5V
(DG)GND
C21 6800/25
C BOARD

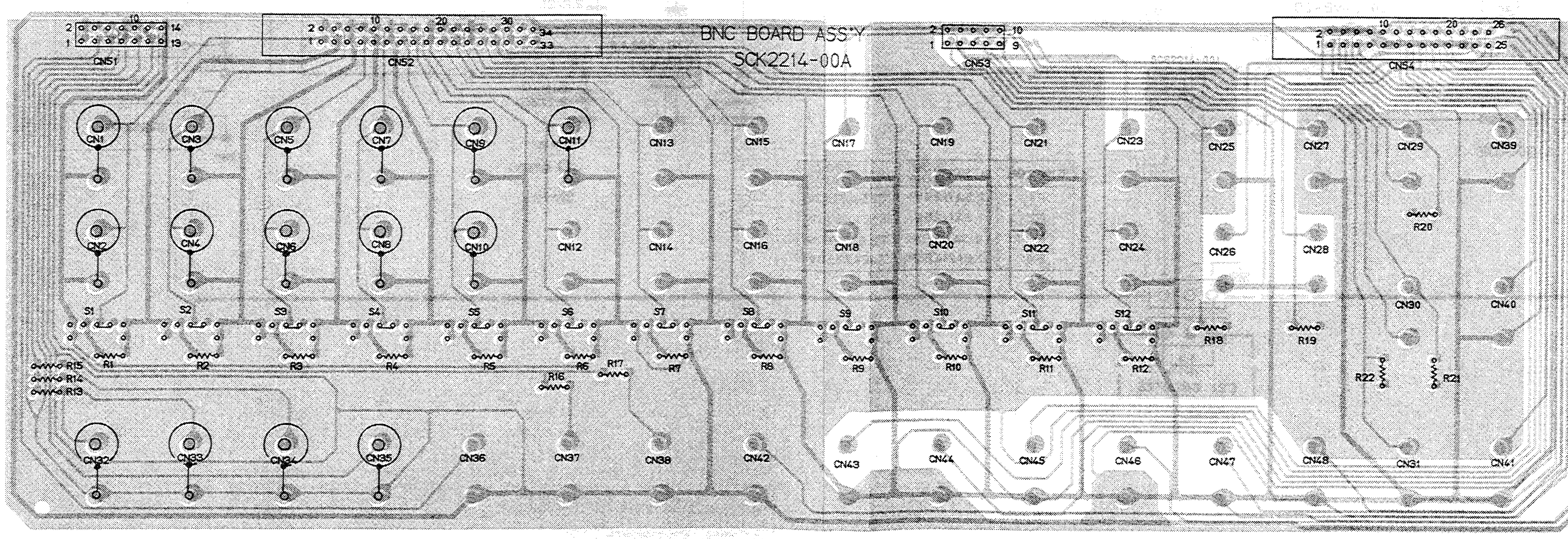
* SYMBOL	NTSC(100V/120V)	PAL(220V/240V)
F1	2.5A/125V	T2.5A/250V
F2	1.6A/125V	T1.6A/250V
F3	2.5A/125V	T2.5A/250V
F4	1.6A/125V	T1.6A/250V

5.23 MT AND BNC CIRCUIT BOARDS

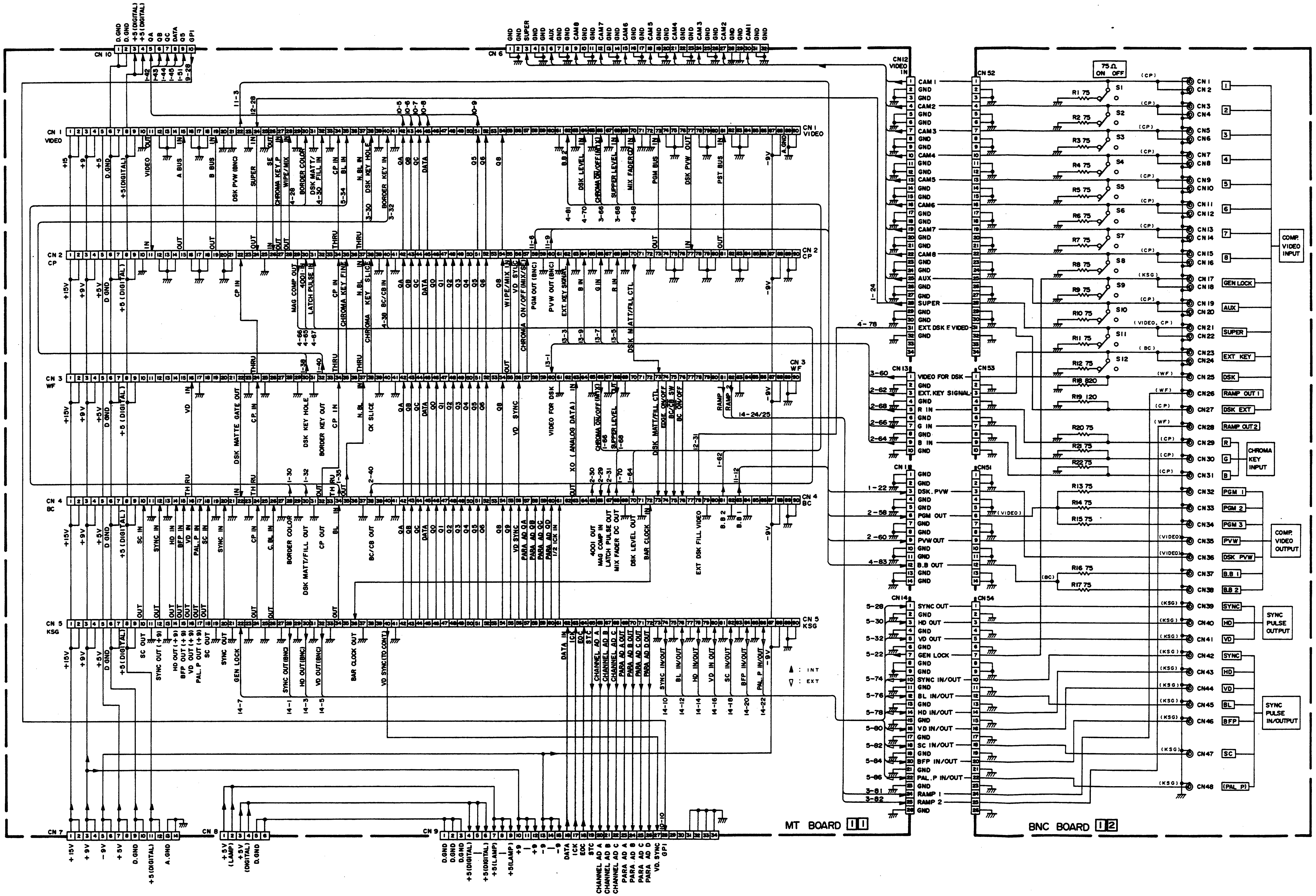
- **MT board**


CN14
CN13
CN12
CN11
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
SC82213-001
SCK2213-00A
KM-2500 MT BOARD ASS'Y

- **BNC board**

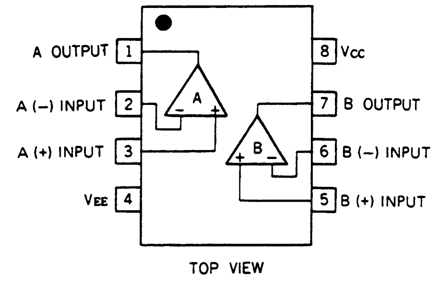

BNC BOARD ASS'Y
SCK2214-00A
CN51
CN52
CN53
CN54
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
CN13
CN14
CN15
CN16
CN17
CN18
CN19
CN20
CN21
CN22
CN23
CN24
CN25
CN26
CN27
CN28
CN29
CN30
CN31
CN32
CN33
CN34
CN35
CN36
CN37
CN38
CN39
CN40
CN41
CN42
CN43
CN44
CN45
CN46
CN47
CN48
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22

5.24 MT AND BNC BOARDS SCHEMATIC DIAGRAM 11/12

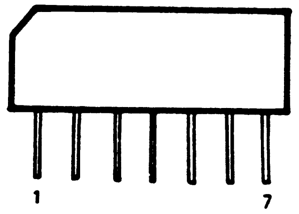

CN 10
D.GND
D.GND
+5 (DIGITAL)
+5 (DIGITAL)
QA
QB
QC
DATA
Q5
GPI
CN 6
CN 1 VIDEO
CN 2 CP
CN 3 WF
CN 4 BC
CN 5 KSG
CN 7
CN 8
CN 9
CN12 VIDEO IN
CN13
CN 11
CN14
CN52
CN53
CN51
CN54
CAM 1
CAM2
CAM3
CAM4
CAM5
CAM6
CAM7
CAM8
AUX
SUPER
EXT. DSK E VIDEO
VIDEO FOR DSK
EXT. KEY SIGNAL
R IN
G IN
B IN
DSK. PVW
PGM OUT
PVW OUT
B.B OUT
SYNC OUT
HD OUT
VD OUT
GEN LOCK
SYNC IN/OUT
BL IN/OUT
HD IN/OUT
VD IN/OUT
SC IN/OUT
BFP IN/OUT
PAL.P IN/OUT
RAMP 1
RAMP 2
75Ω ON OFF
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
CN 1
CN 2
CN 3
CN 4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
CN13
CN14
CN15
CN16
CN17
CN18
CN19
CN20
CN21
CN22
CN23
CN24
CN25
CN26
CN27
CN28
CN29
CN30
CN31
CN32
CN33
CN34
CN35
CN36
CN37
CN38
CN39
CN40
CN41
CN42
CN43
CN44
CN45
CN46
CN47
CN48
1
2
3
4
5
6
7
8
GEN LOCK
AUX
SUPER
EXT KEY
DSK
RAMP OUT 1
DSK EXT
RAMP OUT 2
R
G
B
PGM 1
PGM 2
PGM 3
PVW
DSK PVW
B.B 1
B.B 2
SYNC
HD
VD
SYNC
HD
VD
BL
BFP
SC
PAL P
COMP. VIDEO INPUT
CHROMA KEY INPUT
COMP. VIDEO OUTPUT
SYNC PULSE OUTPUT
SYNC PULSE IN/OUTPUT
▲ : INT
▽ : EXT
MT BOARD 11
BNC BOARD 12
+15V
+9V
-9V
+5V
D.GND
+5 (DIGITAL)
A.GND
+5V (LAMP)
+5V (DIGITAL)
D.GND
DATA
ICK
EOC
STC
CHANNEL AD A
CHANNEL AD B
CHANNEL AD C
PARA AD A
PARA AD B
PARA AD C
PARA AD D
VD. SYNC
GPI

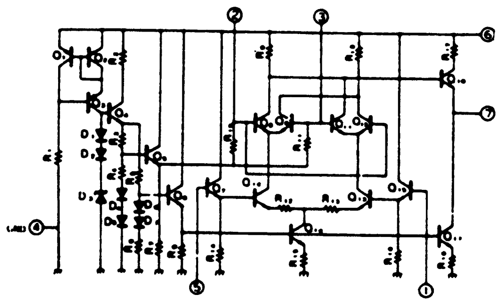
■ SCHEMATIC DIAGRAM OF ICs

AN6914 [MATSUSHITA]
(Dual Comparator)

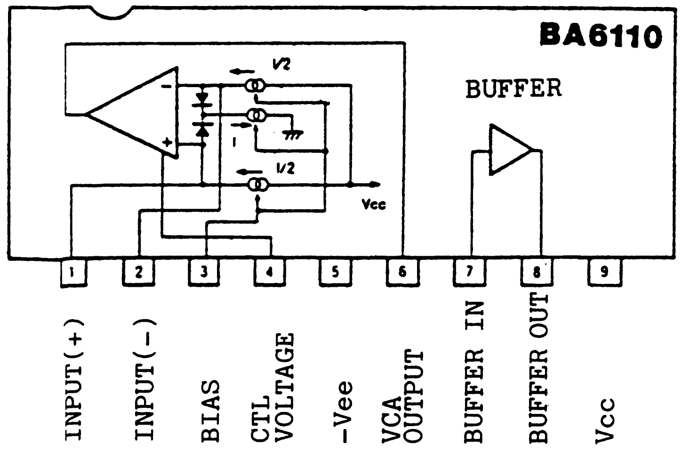

A OUTPUT 1
A (−) INPUT 2
A (+) INPUT 3
VEE 4
8 Vcc
7 B OUTPUT
6 B (−) INPUT
5 B (+) INPUT
A
B
TOP VIEW

AN614 [MATSUSHITA]
(Balance Modulator)

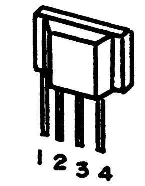




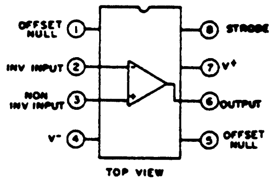
BA6110 [ROHM]
(Voltage Control OP-Amp)


BA6110
BUFFER
V2
I/2
Vcc
1
2
3
4
5
6
7
8
9
INPUT(+)
INPUT(−)
BIAS
CTL VOLTAGE
−Vee
VCA OUTPUT
BUFFER IN
BUFFER OUT
Vcc

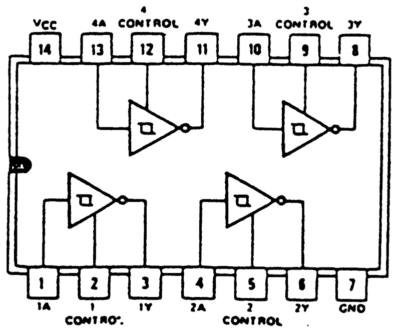
CA3130E [RCA]
(OP. Amp.)



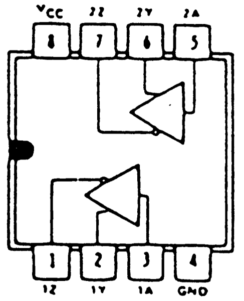
1 : Output
2 : Vcc
3 : Input
4 : GND


OFFSET NULL ①
INV INPUT ②
NON INV INPUT ③
V− ④
⑧ STROBE
⑦ V+
⑥ OUTPUT
⑤ OFFSET NULL
TOP VIEW

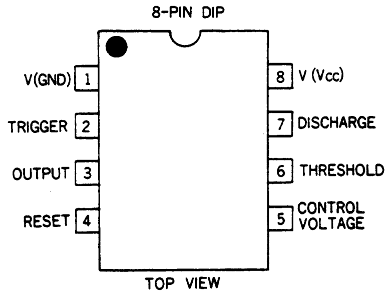
HD75189A [HITACHI]
(Line Driver)


Vcc
4A
4 CONTROL
4Y
3A
3 CONTROL
3Y
14
13
12
11
10
9
8
1
2
3
4
5
6
7
1A
1 CONTROL
1Y
2A
2 CONTROL
2Y
GND

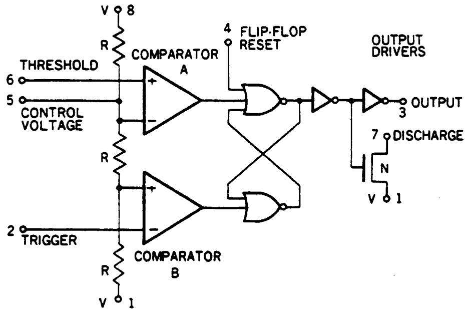
HD75158(P) [HITACHI]
(Line Driver)


Vcc
2Z
2Y
2A
8
7
6
5
1
2
3
4
1Z
1Y
1A
GND

ICM7555IPA [INTERSIL] (Timer)


8-PIN DIP
V(GND) 1
TRIGGER 2
OUTPUT 3
RESET 4
8 V (Vcc)
7 DISCHARGE
6 THRESHOLD
5 CONTROL VOLTAGE
TOP VIEW

Block Diagram

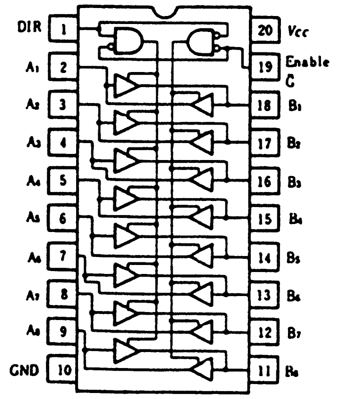

V 8
R
THRESHOLD
6
5
CONTROL VOLTAGE
COMPARATOR A
4 FLIP-FLOP RESET
OUTPUT DRIVERS
3 OUTPUT
7 DISCHARGE
N
V 1
R
2 TRIGGER
COMPARATOR B
R
V 1

This block diagram reduces the circuitry down to its simplest equivalent components.

TRUTH TABLE

THRESHOLD VOLTAGE	TRIGGER VOLTAGE	RESET	OUTPUT	DISCHARGE SWITCH
DONT' CARE	DON'T CARE	LOW	LOW	ON
$>\frac{2}{3}(V^+-V^-)$	$>\frac{2}{3}(V^+-V^-)$	HIGH	LOW	ON
$\frac{1}{3}<V_{TH}<\frac{2}{3}$	$\frac{1}{3}<V_{TH}<\frac{2}{3}$	HIGH	?	?
$<\frac{1}{3}(V^+-V^-)$	$<\frac{1}{3}(V^+-V^-)$	HIGH	HIGH	OFF

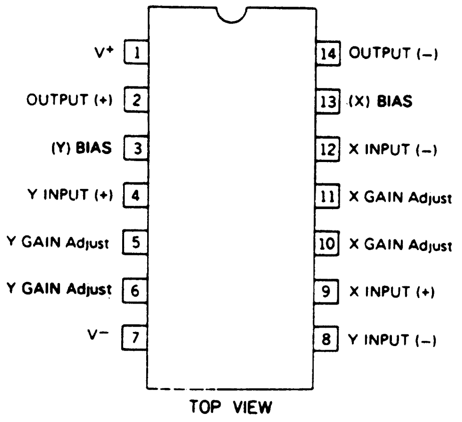
LR74HC245 [SHARP]
(Ocutal Bus Tranceiver)


DIR 1
A1 2
A2 3
A3 4
A4 5
A5 6
A6 7
A7 8
A8 9
GND 10
20 Vcc
19 Enable G
18 B1
17 B2
16 B3
15 B4
14 B5
13 B6
12 B7
11 B8

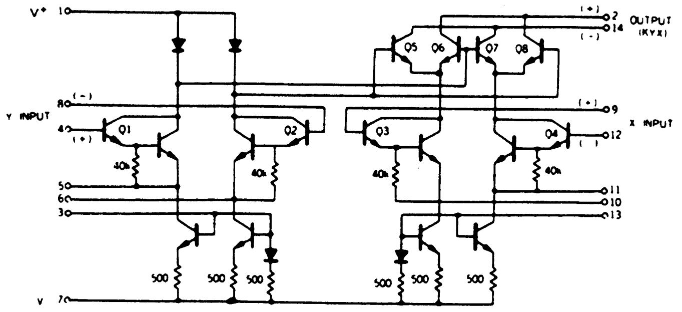
Enable G	Direction Control DIR	Operation
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H ; high level
L ; low level
X ; irrelevant

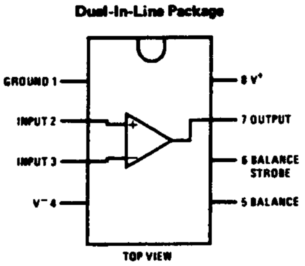
MC1495L [MOTOROLA]
(Four Quadrant Multiplier)


V+ 1
OUTPUT (+) 2
(Y) BIAS 3
Y INPUT (+) 4
Y GAIN Adjust 5
Y GAIN Adjust 6
V− 7
14 OUTPUT (−)
13 (X) BIAS
12 X INPUT (−)
11 X GAIN Adjust
10 X GAIN Adjust
9 X INPUT (+)
8 Y INPUT (−)
TOP VIEW

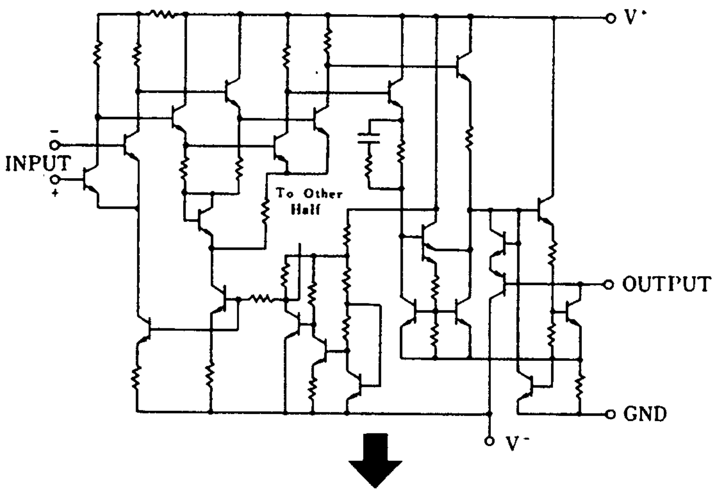
Schematic Diagram

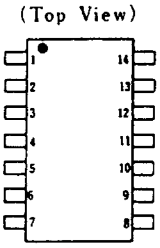

V+ 1
Y INPUT
8
4
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
40k
5
6
3
500
V 7
2
14
OUTPUT (K Y X)
9
12
X INPUT
11
10
13

NJM311D [JRC]
(Voltge Comparator)


Dual-In-Line Package
GROUND 1
INPUT 2
INPUT 3
V⁻ 4
8 V⁺
7 OUTPUT
6 BALANCE STROBE
5 BALANCE
TOP VIEW

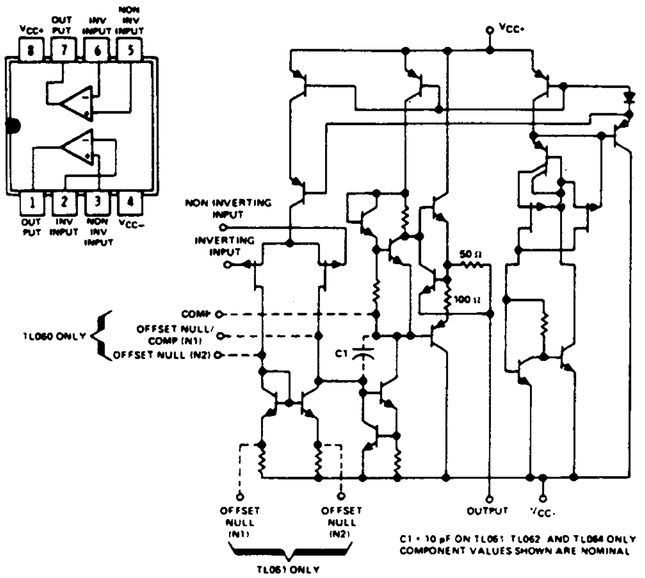
NJM319 [JRC]
(Voltage Comparator)


V⁺
INPUT
−
+
To Other Half
OUTPUT
GND
V⁻


(Top View)
1
2
3
4
5
6
7
8
9
10
11
12
13
14

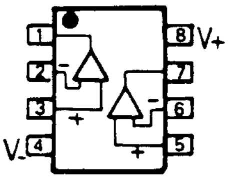
1	NC
2	NC
3 (2)	GND 1
4 (3)	+INPUT
5 (4)	−INPUT
6 (5)	V⁻
7 (6)	OUTPUT 2
8 (7)	GND 2
9 (8)	+INPUT 2
10(9)	−INPUT 2
11(10)	V⁺
12(1)	OUTPUT 1
13	NC
14	NC

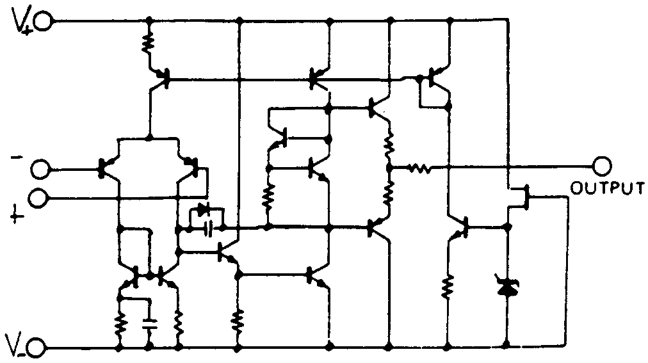
NJM062D [JRC]
NJM082D [JRC]
(Dual Op Amp)


VCC+
OUT PUT
INV INPUT
NON INV INPUT
8
7
6
5
1
2
3
4
OUT PUT
INV INPUT
NON INV INPUT
VCC−
VCC+
NON INVERTING INPUT
INVERTING INPUT
COMP
OFFSET NULL/COMP (N1)
OFFSET NULL (N2)
TL080 ONLY
50 Ω
100 Ω
C1
OFFSET NULL (N1)
OFFSET NULL (N2)
TL081 ONLY
OUTPUT
VCC−

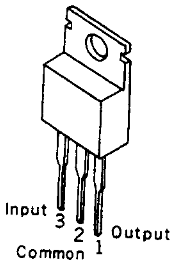
C1 = 10 pF ON TL081, TL082, AND TL084 ONLY
COMPONENT VALUES SHOWN ARE NOMINAL

NJM4558DD [JRC]
NJM4560DD [JRC]
(Dual Op-Amplifier)

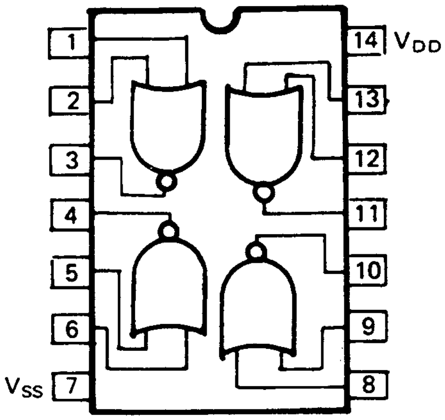

1
2
3
4
8
7
6
5
V+
V-
−
+
−
+



NJM7805A [JRC]
NJM7809A [JRC]
(Voltage Regulator)

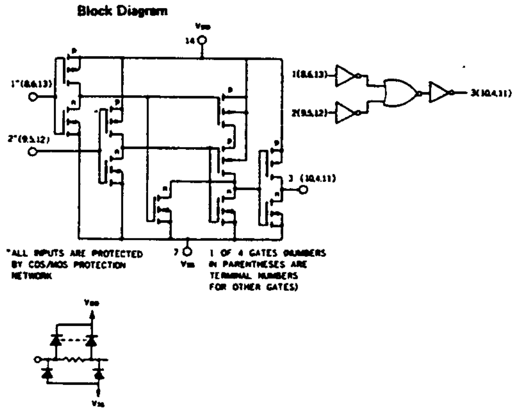

Input 3
2
Common
Output 1

TC4001BP [TOSHIBA]
(Quad 2 Input Nor Gate)

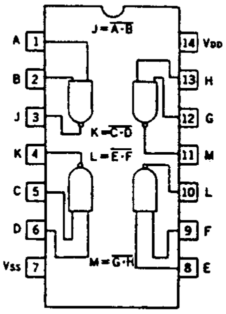


1
2
3
4
5
6
7
Vss
14
VDD
13
12
11
10
9
8

TC4011BP [TOSHIBA]
(Quad 2 Input Nand Gate)

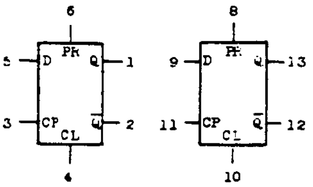


Block Diagram
VDD
14
1*(8,6,13)
2*(9,5,12)
P
N
3 (10,4,11)
1(8,6,13)
2(9,5,12)
3(10,4,11)
*ALL INPUTS ARE PROTECTED BY COS/MOS PROTECTION NETWORK
7
VSS
1 OF 4 GATES (NUMBERS IN PARENTHESES ARE TERMINAL NUMBERS FOR OTHER GATES)
VDD
VSS



A 1
B 2
J 3
K 4
C 5
D 6
Vss 7
14 VDD
13 H
12 G
11 M
10 L
9 F
8 E
$J=\overline{A\cdot B}$
$K=\overline{C\cdot D}$
$L=\overline{E\cdot F}$
$M=\overline{G\cdot H}$

TC4013BAP [TOSHIBA]
(Dual Flip Flop)



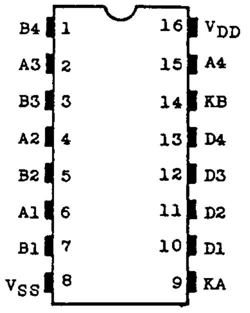
6
5
D
PR
Q
1
3
CP
CL
$\overline{Q}$
2
4
8
9
D
PR
Q
13
11
CP
CL
$\overline{Q}$
12
10

V_{DD} : 14, V_{SS} : 7

INPUTS				OUTPUTS	
CL	PR	D	CP △	Q_{n+1}	$\overline{Q}_{n+1}$
L	H	※	※	H	L
H	L	※	※	L	H
H	H	※	※	L	H
L	L	L	↑	L	H
L	L	H	↑	H	L
L	L	※	↓	Q_n•	$\overline{Q}_n$•

※ ; Don't Care
△ ; Level Change
• ; No Change

TC4019BP/TC4019BF [TOSHIBA]
(Quad and/or Select Gate)



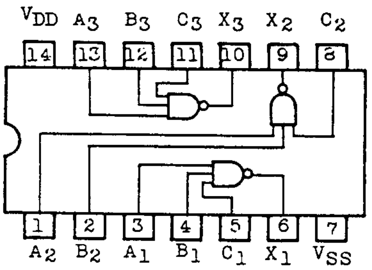
B4 1
A3 2
B3 3
A2 4
B2 5
A1 6
B1 7
VSS 8
16 VDD
15 A4
14 KB
13 D4
12 D3
11 D2
10 D1
9 KA

(TOP VIEW)

INPUTS				OUTPUT
KA	KB	An	Bn	Dn
H	L	H	※	H
H	L	L	※	L
L	H	※	H	H
L	H	※	L	L
L	L	※	※	L
H	H	L	L	L
H	H	L	H	H
H	H	H	L	H
H	H	H	H	H

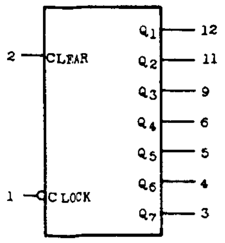
L : Low Level
H : High Level
※ : Don't Care

TC4023BP/TC4023BF [TOSHIBA]
(Triple 3 Input Nand Gate)



V_{DD}
A_3
B_3
C_3
X_3
X_2
C_2
14
13
12
11
10
9
8
1
2
3
4
5
6
7
A_2
B_2
A_1
B_1
C_1
X_1
V_{SS}

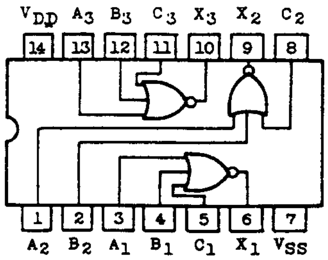
TC4024BP [TOSHIBA]
(7 Stage Ripple-Carry Binary Counter)



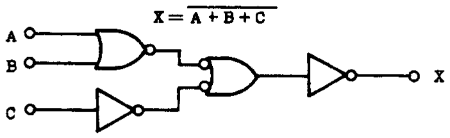
2
CLEAR
1
CLOCK
Q_1 12
Q_2 11
Q_3 9
Q_4 6
Q_5 5
Q_6 4
Q_7 3

V_{DD} : 14
V_{SS} : 7
NC : 8, 10, 13

TC4025BF [TOSHIBA]
(Triple 3 Input NOR Gate)

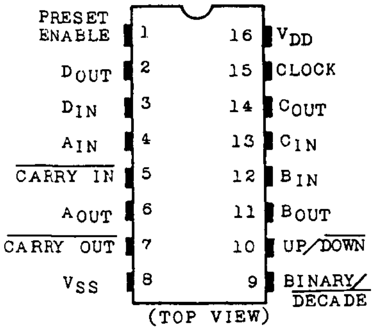


V_{DD}
A_3
B_3
C_3
X_3
X_2
C_2
14
13
12
11
10
9
8
1
2
3
4
5
6
7
A_2
B_2
A_1
B_1
C_1
X_1
V_{SS}



$X=\overline{A+B+C}$
A
B
C
X

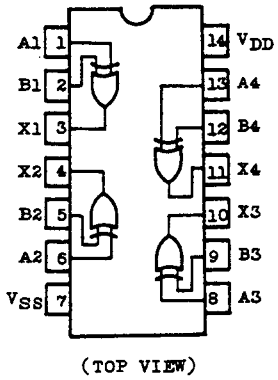
TC4029BP/TC4029BF [TOSHIBA]
(Presettable Up/Down Counter)


PRESET ENABLE 1
D_{OUT} 2
D_{IN} 3
A_{IN} 4
$\overline{\text{CARRY IN}}$ 5
A_{OUT} 6
$\overline{\text{CARRY OUT}}$ 7
V_{SS} 8
16 V_{DD}
15 CLOCK
14 C_{OUT}
13 C_{IN}
12 B_{IN}
11 B_{OUT}
10 UP/$\overline{\text{DOWN}}$
9 BINARY/$\overline{\text{DECADE}}$
(TOP VIEW)

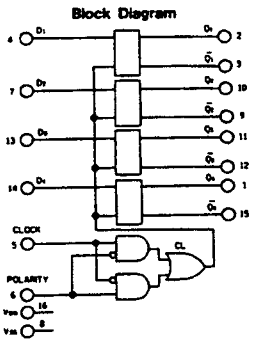
$\overline{\text{CARRY IN}}$	PRESET ENABLE	UP/$\overline{\text{DOWN}}$	BINARY/$\overline{\text{DECADE}}$	動作モード
L	L	H	※	UP COUNT
L	L	L	※	DOWN COUNT
※	H	※	※	PRESET
H	L	※	※	NO COUNT
L	L	※	H	BINARY COUNT
L	L	※	L	DECADE COUNT

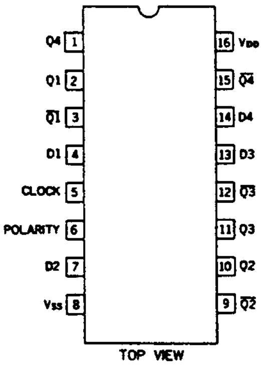
※ Don't Care

TC4030BP [TOSHIBA]
(Quad Exclusive-or Gate)


A1 1
B1 2
X1 3
X2 4
B2 5
A2 6
V_{SS} 7
14 V_{DD}
13 A4
12 B4
11 X4
10 X3
9 B3
8 A3
(TOP VIEW)

TC4042BP [TOSHIBA] (Quadruple Clock "D" Latch)

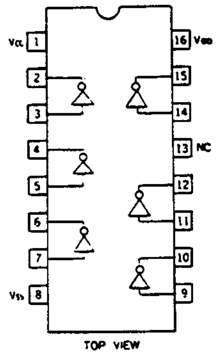

Block Diagram
4 D1
7 D2
13 D3
14 D4
Q1 2
$\overline{Q}$1 3
Q2 10
$\overline{Q}$2 9
Q3 11
$\overline{Q}$3 12
Q4 1
$\overline{Q}$4 15
CLOCK 5
POLARITY 6
CL
V_{DD} 16
V_{SS} 8


Q4 1
Q1 2
$\overline{Q}$1 3
D1 4
CLOCK 5
POLARITY 6
D2 7
V_{SS} 8
16 V_{DD}
15 $\overline{Q}$4
14 D4
13 D3
12 $\overline{Q}$3
11 Q3
10 Q2
9 $\overline{Q}$2
TOP VIEW

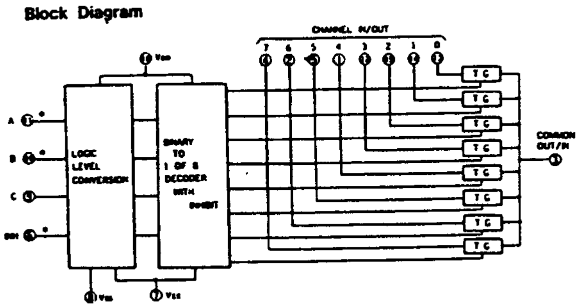
TRUTH TABLE

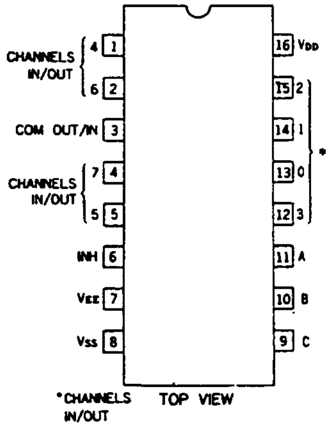
CLOCK	POLARITY	Q
0	0	D
↑	0	LATCH
1	1	D
↓	1	LATCH

TC4049 [TOSHIBA]
(Hex Buffer/Inverter)


V_{CC} 1
2
3
4
5
6
7
V_{SS} 8
16 V_{DD}
15
14
13 NC
12
11
10
9
TOP VIEW

TC4051BP [TOSHIBA]
(Single 8-channel Multiplexer/Demultiplexer)


Block Diagram
CHANNEL IN/OUT
7 6 5 4 3 2 1 0
V_{DD}
A
B
C
INH
LOGIC LEVEL CONVERSION
BINARY TO 1 OF 8 DECODER WITH INHIBIT
TG
COMMON OUT/IN
V_{SS}
V_{EE}

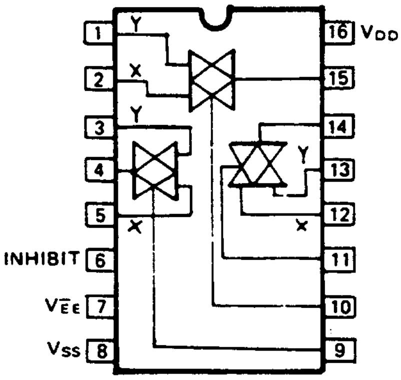

CHANNELS IN/OUT 4 1
6 2
COM OUT/IN 3
CHANNELS IN/OUT 7 4
5 5
INH 6
V_{EE} 7
V_{SS} 8
16 V_{DD}
15 2
14 1
13 0
12 3
11 A
10 B
9 C
*CHANNELS IN/OUT
TOP VIEW

TRUTH TABLE

INPUT STATES				"ON" CHANNEL(S)
INHIBIT	C	B	A	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	X	X	X	NONE

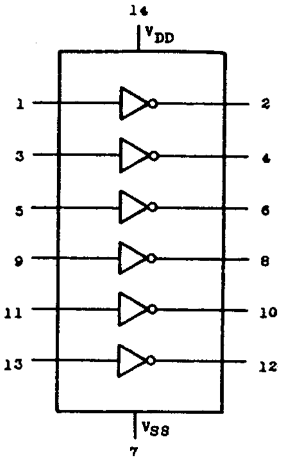
X=Don't care

TC4053BP [TOSHIBA]
(Tripple 2 Channel Multiplexer/Demulti Plexer)

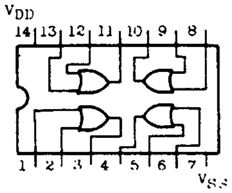

1
2
3
4
5
INHIBIT 6
VEE 7
Vss 8
16 VDD
15
14
13
12
11
10
9
Y
X
Y
Y
X
X

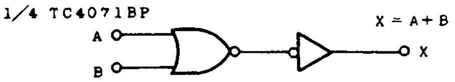
CONTROL H : Y OUTPUT

TC4069UPB [TOSHIBA]
(Hex Inverter)

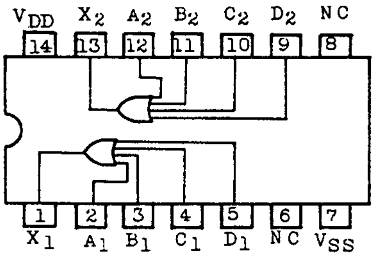

14
VDD
1
2
3
4
5
6
9
8
11
10
13
12
VSS
7

TC4071BP [TOSHIBA]
(Quad 2-Input Positive or Gate)

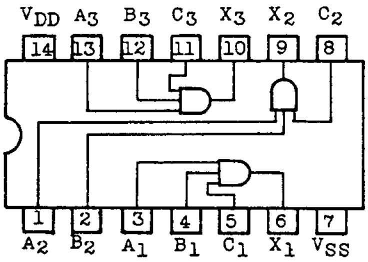

VDD
14
13
12
11
10
9
8
1
2
3
4
5
6
7
VSS


1/4 TC4071BP
A
B
X = A + B
X

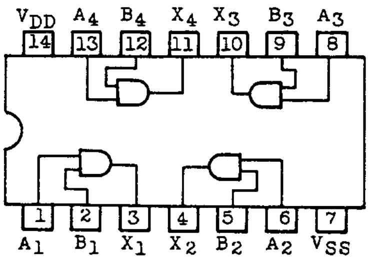
TC4072BP/TC4072BF [TOSHIBA]
(Dual 4 Input or Gate)


VDD X2 A2 B2 C2 D2 NC
14 13 12 11 10 9 8
1 2 3 4 5 6 7
X1 A1 B1 C1 D1 NC VSS

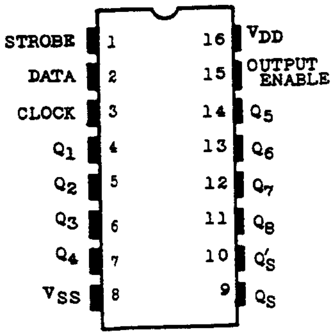
TC4073BP/TC4073BF [TOSHIBA]
(Triple 3 Input and Gate)


VDD A3 B3 C3 X3 X2 C2
14 13 12 11 10 9 8
1 2 3 4 5 6 7
A2 B2 A1 B1 C1 X1 VSS

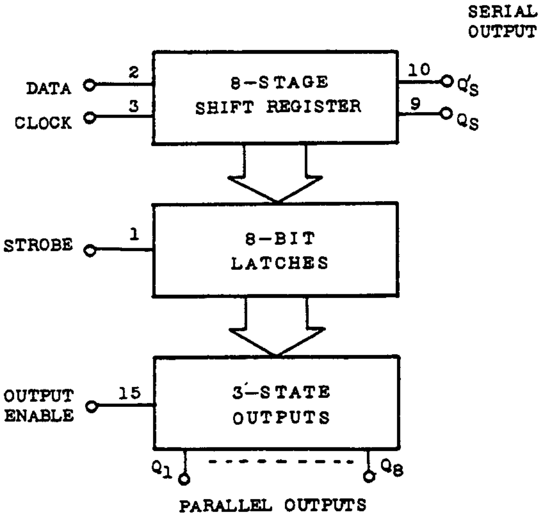
TC4081BP/TC4081BF [TOSHIBA]
(Quad 2 Input and Gate)


VDD A4 B4 X4 X3 B3 A3
14 13 12 11 10 9 8
1 2 3 4 5 6 7
A1 B1 X1 X2 B2 A2 VSS

TC4094 [TOSHIBA]
(8-Stage Shift-And-Store Busregister)


STROBE 1
DATA 2
CLOCK 3
Q1 4
Q2 5
Q3 6
Q4 7
VSS 8
16 VDD
15 OUTPUT ENABLE
14 Q5
13 Q6
12 Q7
11 Q8
10 Q'S
9 QS

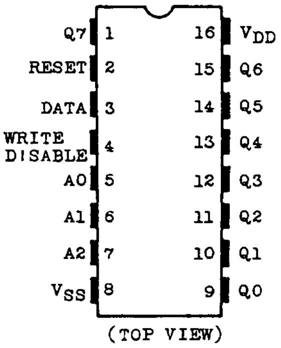
(TOP VIEW)


SERIAL OUTPUT
DATA
2
CLOCK
3
8-STAGE SHIFT REGISTER
10
Q'S
9
QS
STROBE
1
8-BIT LATCHES
OUTPUT ENABLE
15
3-STATE OUTPUTS
Q1
Q8
PARALLEL OUTPUTS

CL	OE	ST	D	PO		SO	
				Q_1	Q_n	Q_S	Q'_S
↑	H	H	L	L	Q_n-1	Q_7	NC
↑	H	H	H	H	Q_n-1	Q_7	NC
↑	H	L	*	NC	NC	Q_7	NC
↑	L	*	*	HZ	HZ	Q_7	NC
↓	H	*	*	NC	NC	NC	Q_S
↓	L	*	*	HZ	HZ	NC	Q_S

CL=Clock
OE=Output Enable
ST=Strobe
D =Data
PO=Parallel Outputs
SO=Serial Output
* =Don't care
NC=No Change
HZ=High Impedance

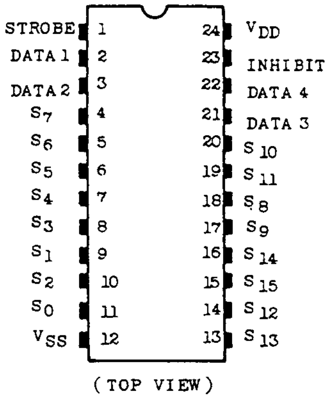
TC4099BP/TC4099BF [TOSHIBA]
(8-Bit Addressable Latch)


Q7 1
RESET 2
DATA 3
WRITE DISABLE 4
A0 5
A1 6
A2 7
VSS 8
16 VDD
15 Q6
14 Q5
13 Q4
12 Q3
11 Q2
10 Q1
9 Q0
(TOP VIEW)

CONTROL INPUTS		ADDRESS INPUTS			OUTPUTS							
RESET	WRITE DISABLE	A2	A1	A0	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7
H	H	X	X	X	L	L	L	L	L	L	L	L
L	H	X	X	X	—	—	—	—	—	—	—	—
H	L	L	L	L	D	L	L	L	L	L	L	L
H	L	L	L	H	L	D	L	L	L	L	L	L
H	L	L	H	L	L	L	D	L	L	L	L	L
H	L	L	H	H	L	L	L	D	L	L	L	L
H	L	H	L	L	L	L	L	L	D	L	L	L
H	L	H	L	H	L	L	L	L	L	D	L	L
H	L	H	H	L	L	L	L	L	L	L	D	L
H	L	H	H	H	L	L	L	L	L	L	L	D
L	L	L	L	L	D	—	—	—	—	—	—	—
L	L	L	L	H	—	D	—	—	—	—	—	—
L	L	L	H	L	—	—	D	—	—	—	—	—
L	L	L	H	H	—	—	—	D	—	—	—	—
L	L	H	L	L	—	—	—	—	D	—	—	—
L	L	H	L	H	—	—	—	—	—	D	—	—
L	L	H	H	L	—	—	—	—	—	—	D	—
L	L	H	H	H	—	—	—	—	—	—	—	D

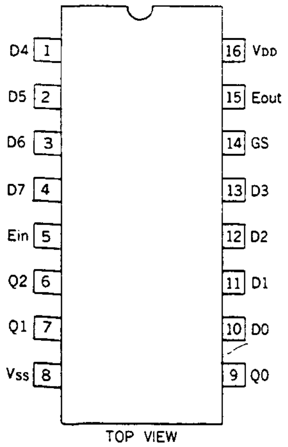
X : DON'T CARE D: DATA INPUT — : HOLDS PREVIOUS DATA

TC4515BP [TOSHIBA]
(4-Bit Latch/4-To-16 Line Decoder)


STROBE 1
DATA 1 2
DATA 2 3
S7 4
S6 5
S5 6
S4 7
S3 8
S1 9
S2 10
S0 11
VSS 12
24 VDD
23 INHIBIT
22 DATA 4
21 DATA 3
20 S10
19 S11
18 S8
17 S9
16 S14
15 S15
14 S12
13 S13
(TOP VIEW)

INHIBIT	DATA INPUT				SELECTED OUTPUT TC4514BP — 'H' TC4515BP — 'L'
	$DATA_1$	$DATA_2$	$DATA_3$	$DATA_4$	
L	L	L	L	L	S_0
L	H	L	L	L	S_1
L	L	H	L	L	S_2
L	H	H	L	L	S_3
L	L	L	H	L	S_4
L	H	L	H	L	S_5
L	L	H	H	L	S_6
L	H	H	H	L	S_7
L	L	L	L	H	S_8
L	H	L	L	H	S_9
L	L	H	L	H	S_{10}
L	H	H	L	H	S_{11}
L	L	L	H	H	S_{12}
L	H	L	H	H	S_{13}
L	L	H	H	H	S_{14}
L	H	H	H	H	S_{15}
H	*	*	*	*	TC4514BP-ALL OUTPUTS'L' TC4515BP-ALL OUTPUTS'H'

TC4532BP [TOSHIBA]
(8-Bit Priority Encorder)

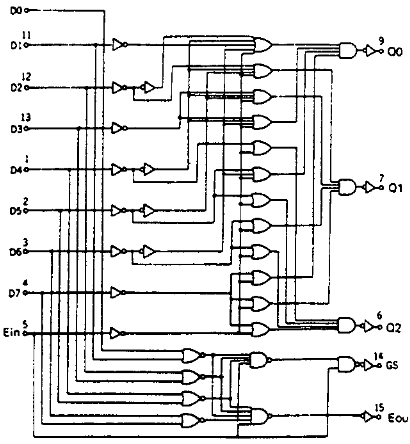

D4 1
D5 2
D6 3
D7 4
Ein 5
Q2 6
Q1 7
Vss 8
16 VDD
15 Eout
14 GS
13 D3
12 D2
11 D1
10 D0
9 Q0
TOP VIEW

TRUTH TABLE

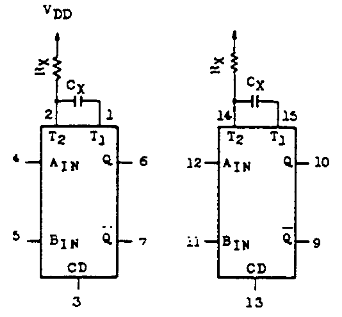
INPUT									OUTPUT				
E_{IN}	D7	D6	D5	D4	D3	D2	D1	D0	GS	Q2	Q1	Q0	E_{OUT}
0	×	×	×	×	×	×	×	×	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	1
1	1	×	×	×	×	×	×	×	1	1	1	1	0
1	0	1	×	×	×	×	×	×	1	1	1	0	0
1	0	0	1	×	×	×	×	×	1	1	0	1	0
1	0	0	0	1	×	×	×	×	1	1	0	0	0
1	0	0	0	0	1	×	×	×	1	0	1	1	0
1	0	0	0	0	0	1	×	×	1	0	1	0	0
1	0	0	0	0	0	0	1	×	1	0	0	1	0
1	0	0	0	0	0	0	0	1	1	0	0	0	0

X = Don't Care

Logic Diagram


10 D0
11 D1
12 D2
13 D3
1 D4
2 D5
3 D6
4 D7
5 Ein
9 Q0
7 Q1
6 Q2
14 GS
15 Eout

TC4538 [TOSHIBA]
(Resettable MONO Maltivibrator)

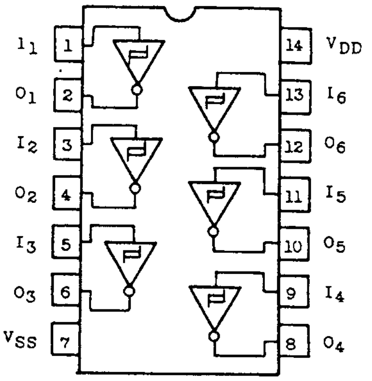

VDD
Rx
Cx
2
1
T2
T1
4
AIN
Q
6
5
BIN
Q̄
7
CD
3
Rx
Cx
14
15
T2
T1
12
AIN
Q
10
11
BIN
Q̄
9
CD
13

V_{DD} : 16, V_{SS} : 8

INPUT			OUTPUT		NOTE
A_{IN}	B_{IN}	CD	Q	$\bar{Q}$	
↑	H	H	⊓	⊔	OUTPUT ENABLE
↑	L	H	L	H	INHIBIT
H	↓	H	L	H	INHIBIT
L	↓	H	⊓	⊔	OUTPUT ENABLE
*	*	L	L	H	INHIBIT

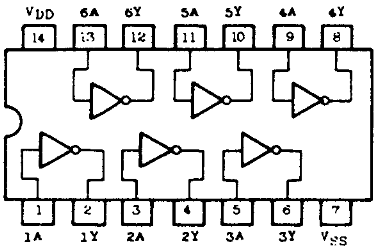
* Don't Care

TC4584BP/TC4584BF [TOSHIBA]
(Hex Schmitt Trigger)

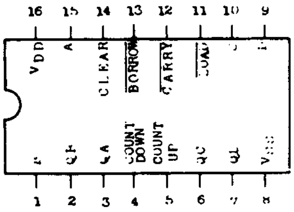

I1
1
O1
2
I2
3
O2
4
I3
5
O3
6
VSS
7
14
VDD
13
I6
12
O6
11
I5
10
O5
9
I4
8
O4

(TOP VIEW)

TC40H004P [TOSHIBA]
(Hex Inverter)


VDD
6A
6Y
5A
5Y
4A
4Y
14
13
12
11
10
9
8
1
2
3
4
5
6
7
1A
1Y
2A
2Y
3A
3Y
VSS

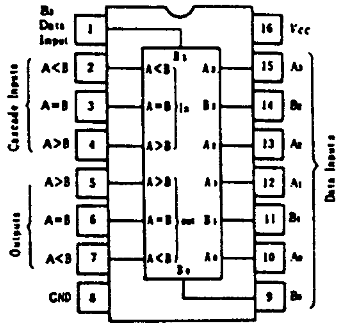
TC40H193P [TOSHIBA]
(Synchronous 4-Bit Binary Up/Down Counter Dual Clock With Clear)


16
15
14
13
12
11
10
9
VDD
A
CLEAR
BORROW
CARRY
LOAD
COUNT DOWN
COUNT UP
VSS
1
2
3
4
5
6
7
8

COUNT UP	COUNT DOWN	LOAD	CLEAR	ACTION
↑	H	H	L	COUNT UP
↓	H	H	L	NO COUNT
H	↑	H	L	COUNT DOWN
H	↓	H	L	NO COUNT
*	*	L	L	PRESET
*	*	*	H	RESET

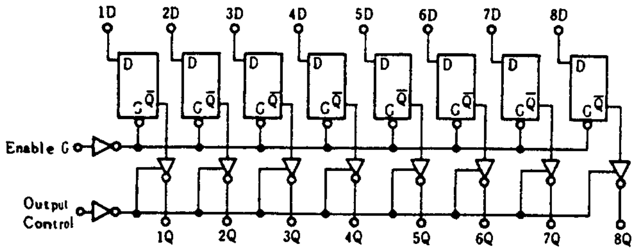
* Don't care

TC74HC85 [TOSHIBA]
(4-Bit Magnitude Comparator)


B3 Data Input
1
Cascade Inputs
A<B
2
A=B
3
A>B
4
Outputs
A>B
5
A=B
6
A<B
7
GND
8
16
Vcc
15
A3
14
B2
13
A2
12
A1
11
B1
10
A0
9
B0
Data Inputs
A<B
A=B
A>B
A>B
A=B
A<B
B3
A3
I2
B2
A2
A1
out
B1
A0
B0

Data Word Input				Cascading Input			Output		
A3, B3	A2, B2	A1, B1	A0, B0	A>Bin	A=Bin	A<Bin	A>Bout	A=Bout	A<Bout
A3>B3	X	X	X	X	X	X	H	L	L
A3<B3	X	X	X	X	X	X	L	L	H
A3=B3	A2>B2	X	X	X	X	X	H	L	L
A3=B3	A2<B2	X	X	X	X	X	L	L	H
A3=B3	A2=B2	A1>B1	X	X	X	X	H	L	L
A3=B3	A2=B2	A1<B1	X	X	X	X	L	L	H
A3=B3	A2=B2	A1=B1	A0>B0	X	X	X	H	L	L
A3=B3	A2=B2	A1=B1	A0<B0	X	X	X	L	L	H
A3=B3	A2=B2	A1=B1	A0=B0	L	L	L	H	L	H
A3=B3	A2=B2	A1=B1	A0=B0	L	L	H	L	L	H
A3=B3	A2=B2	A1=B1	A0=B0	H	L	L	H	L	L
A3=B3	A2=B2	A1=B1	A0=B0	H	L	H	L	L	L
A3=B3	A2=B2	A1=B1	A0=B0	X	H	X	L	H	L

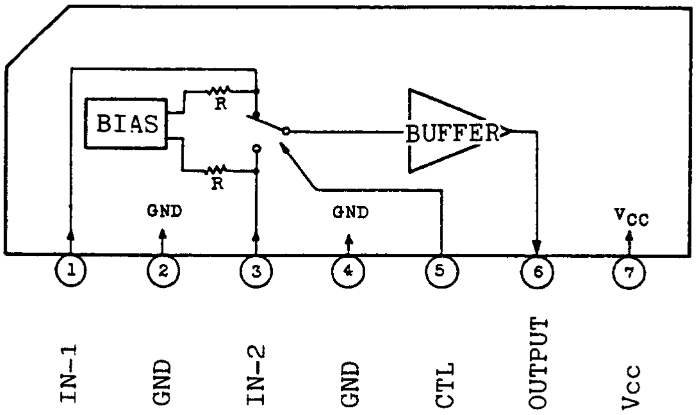
HD74HC373 [HITACHI]
(Octual D-type Latch with 3-state Output)


1D
2D
3D
4D
5D
6D
7D
8D
D
G
Q̄
Enable G
Output Control
1Q
2Q
3Q
4Q
5Q
6Q
7Q
8Q

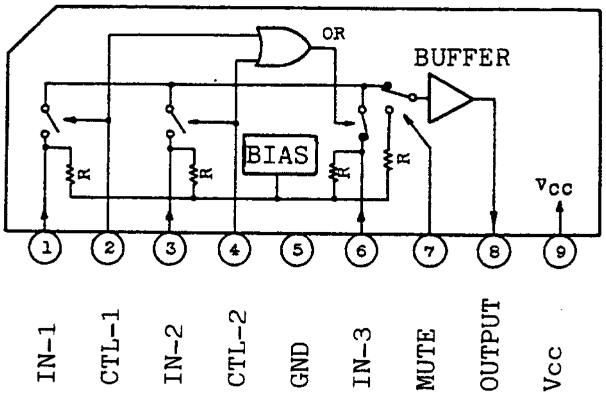
Output Control	Enable G	D	HD74HC373 Q
L	H	H	H
L	H	L	L
L	L	X	No Change
H	X	X	Z

X : Don't Care
Z : High Impedance

TA7347P [TOSHIBA]
(2-Input Switch)


BIAS
R
R
BUFFER
GND
GND
Vcc
1
2
3
4
5
6
7
IN-1
GND
IN-2
GND
CTL
OUTPUT
Vcc

TA7348P [TOSHIBA]
(3-Input Switch)

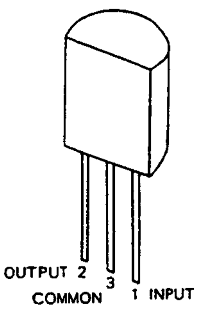

OR
BUFFER
BIAS
R
R
R
R
Vcc
1
2
3
4
5
6
7
8
9
IN-1
CTL-1
IN-2
CTL-2
GND
IN-3
MUTE
OUTPUT
Vcc

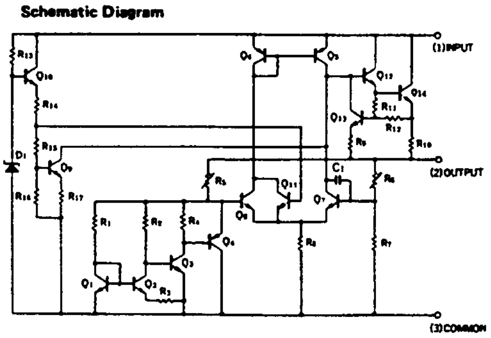
TRUTH TABLE

CTL-1	CTL-2	MUTE	OUTPUT
H	L	L	IN-1
L	H	L	IN-2
L	L	L	IN-3
H	H	H	UNKNOWN
*	*	*	NONE

* Don't care

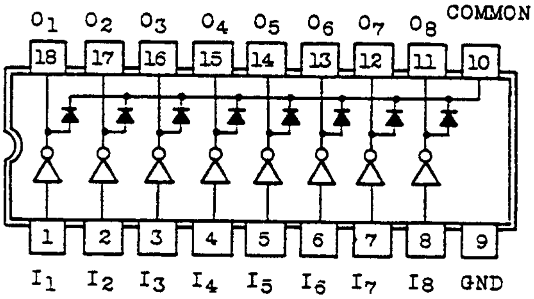
TA78L005AP [TOSHIBA]
(Voltage Regulator)

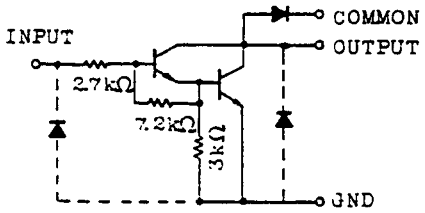

OUTPUT 2
3
COMMON
1 INPUT


Schematic Diagram
(1)INPUT
(2)OUTPUT
(3)COMMON

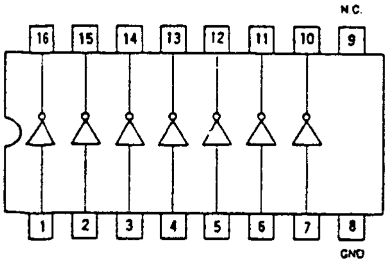
TA78L005AP→ 5 V
TA78L012AP→12V

TD62083AP [TOSHIBA]
(Darlington Driver)

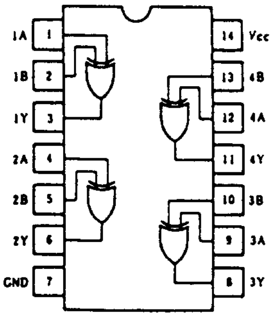

O1 O2 O3 O4 O5 O6 O7 O8 COMMON
18 17 16 15 14 13 12 11 10
1 2 3 4 5 6 7 8 9
I1 I2 I3 I4 I5 I6 I7 I8 GND


INPUT
COMMON
OUTPUT
2.7kΩ
7.2kΩ
3kΩ
GND

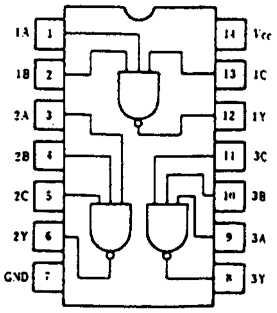
TD62504P [TOSHIBA]
(Lamp Driver)


N.C.
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
GND

TC74HC86 [TOSHIBA]
(Quad 2 Input Exclusive -OR gates)


1A 1
1B 2
1Y 3
2A 4
2B 5
2Y 6
GND 7
14 Vcc
13 4B
12 4A
11 4Y
10 3B
9 3A
8 3Y

TC74HC10 [TOSHIBA]
(Triple 3-input AND Gates)


1A 1
1B 2
2A 3
2B 4
2C 5
2Y 6
GND 7
14 Vcc
13 1C
12 1Y
11 3C
10 3B
9 3A
8 3Y

SECTION 6
ELECTRICAL PARTS LIST

6.1 SB board assembly 01

01□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	ICM7555IPA	IC	INTERSIL
IC2	TC4584BP	IC	TOSHIBA
IC3	TC40H004P	IC	TOSHIBA
IC4	TC4053BP	IC	TOSHIBA
IC5	TC4053BP	IC	TOSHIBA
IC6	TC4042BP	IC	TOSHIBA
IC7	NJM4558DD	IC	JRC
IC8	TD62504P	IC	TOSHIBA
IC9	TC4051BP	IC	TOSHIBA
IC10	TC4011BP	IC	TOSHIBA
IC11	TC4532BP	IC	TOSHIBA
IC12	TD62504P	IC	TOSHIBA
IC13	TC4051BP	IC	TOSHIBA
IC14	TC4532BP	IC	TOSHIBA
IC15	TD62504P	IC	TOSHIBA
IC16	TC4532BP	IC	TOSHIBA
IC17	TC4584BP	IC	TOSHIBA
IC18	TC4013BAP	IC	TOSHIBA
IC19	TC4532BP	IC	TOSHIBA
IC20	TC4532BP	IC	TOSHIBA
IC21	TD62504P	IC	TOSHIBA
IC22	TC4051BP	IC	TOSHIBA
IC23	TD62504P	IC	TOSHIBA
IC24	TC4532BP	IC	TOSHIBA
IC25	TC4532BP	IC	TOSHIBA
IC26	TC4051BP	IC	TOSHIBA
IC27	TD62504P	IC	TOSHIBA
IC28	TC4532BP	IC	TOSHIBA
IC29	TC4051BP	IC	TOSHIBA
IC30	TD62504P	IC	TOSHIBA
IC31	TC4532BP	IC	TOSHIBA
IC32	TD62504P	IC	TOSHIBA
IC33	TC4051BP	IC	TOSHIBA
IC34	TD62504P	IC	TOSHIBA
IC35	NJM4558DD	IC	JRC
IC36	TC4051BP	IC	TOSHIBA
IC37	TC4051BP	IC	TOSHIBA
IC38	TC4053BP	IC	TOSHIBA
IC39	CA3130E	IC	RCA
IC40	TC40H004P	IC	TOSHIBA
IC41	TC4013BAP	IC	TOSHIBA
IC42	TC4081BP	IC	TOSHIBA
IC43	TC4029BP	IC	TOSHIBA
IC44	TC4029BP	IC	TOSHIBA
IC45	LR74HC245	IC	SHARP
IC46	TC4071BP	IC	TOSHIBA
Q1	2SC1685(R)	Transistor	MATSUSHITA
Q2	2SA564(R)	Transistor	MATSUSHITA
Q3	2SA564(R)	Transistor	MATSUSHITA
Q4	2SA564(R)	Transistor	MATSUSHITA
Q5	2SA564(R)	Transistor	MATSUSHITA
Q6	2SA564(R)	Transistor	MATSUSHITA
Q7	2SA564(R)	Transistor	MATSUSHITA
Q8	2SA564(R)	Transistor	MATSUSHITA
Q9	2SA564(R)	Transistor	MATSUSHITA
Q10	2SA564(R)	Transistor	MATSUSHITA
Q11	2SA564(R)	Transistor	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	MA165	Diode	MATSUSHITA
D7	MA165	Diode	MATSUSHITA
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	MA165	Diode	MATSUSHITA
D12	MA165	Diode	MATSUSHITA
D13	MA165	Diode	MATSUSHITA
D14	MA165	Diode	MATSUSHITA
D15	MA165	Diode	MATSUSHITA
D16	MA165	Diode	MATSUSHITA
D17	MA165	Diode	MATSUSHITA
D18	MA165	Diode	MATSUSHITA
D19	MA165	Diode	MATSUSHITA
D20	MA165	Diode	MATSUSHITA
D21	MA165	Diode	MATSUSHITA
D22	MA165	Diode	MATSUSHITA
D23	MA165	Diode	MATSUSHITA
D24	MA165	Diode	MATSUSHITA
D25	MA165	Diode	MATSUSHITA
D26	MA165	Diode	MATSUSHITA
D27	MA165	Diode	MATSUSHITA
D28	MA165	Diode	MATSUSHITA
D29	MA165	Diode	MATSUSHITA
D30	MA165	Diode	MATSUSHITA
D31	MA165	Diode	MATSUSHITA
D32	MA165	Diode	MATSUSHITA
D33	MA165	Diode	MATSUSHITA
D34	MA165	Diode	MATSUSHITA
D35	MA165	Diode	MATSUSHITA
D36	MA165	Diode	MATSUSHITA
D37	MA165	Diode	MATSUSHITA
D38	MA165	Diode	MATSUSHITA
D39	MA165	Diode	MATSUSHITA
D40	MA165	Diode	MATSUSHITA
D41	MA165	Diode	MATSUSHITA
D42	MA165	Diode	MATSUSHITA
D43	MA165	Diode	MATSUSHITA
D44	MA165	Diode	MATSUSHITA
D45	MA165	Diode	MATSUSHITA
D46	MA165	Diode	MATSUSHITA
D47	MA165	Diode	MATSUSHITA
D48	MA165	Diode	MATSUSHITA
D49	MA165	Diode	MATSUSHITA
D50	MA165	Diode	MATSUSHITA
D51	GL-5HD42	LED	SHARP
D52	GL-5HD42	LED	SHARP
D53	GL-5HE42	LED	SHARP
D54	GL-5HD42	LED	SHARP
D55	MA165	Diode	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
R1	QRD161J-102	CR	1 K 1/6 W
R2	QRD161J-102	CR	1 K 1/6 W
R3	QRD161J-472	CR	4.7 K 1/6 W
R4	QRD161J-104	CR	100 K 1/6 W
R5	QRD161J-222	CR	2.2 K 1/6 W
R6	QRD161J-103	CR	10 K 1/6 W
R7	QRD161J-223	CR	22 K 1/6 W
R8	QRD161J-223	CR	22 K 1/6 W
R9	QRD161J-472	CR	4.7 K 1/6 W
R10	QRD161J-472	CR	4.7 K 1/6 W
R11	QRD161J-104	CR	100 K 1/6 W
R12	QRD161J-472	CR	4.7 K 1/6 W
R13	QRD161J-472	CR	4.7 K 1/6 W
R14	QRD161J-472	CR	4.7 K 1/6 W
R15	QRD161J-472	CR	4.7 K 1/6 W
R16	QRD161J-473	CR	47 K 1/6 W
R17	QRD161J-473	CR	47 K 1/6 W
R18	QRD161J-473	CR	47 K 1/6 W
R19	QRD161J-472	CR	4.7 K 1/6 W
R20	QRD161J-472	CR	4.7 K 1/6 W
R21	QRD161J-103	CR	10 K 1/6 W
R22	QRD161J-103	CR	10 K 1/6 W
R23	QRD161J-104	CR	100 K 1/6 W
R24	QRD161J-104	CR	100 K 1/6 W
R25	QRD161J-102	CR	1 K 1/6 W
R26	QRD161J-104	CR	100 K 1/6 W
R27	QRD161J-102	CR	1 K 1/6 W
R28	QRD161J-102	CR	1 K 1/6 W
R29	QRD161J-102	CR	1 K 1/6 W
R30	QRD161J-562	CR	5.6 K 1/6 W
R31	QRD161J-562	CR	5.6 K 1/6 W
R32	QRD161J-104	CR	100 K 1/6 W
R33	QRD161J-104	CR	100 K 1/6 W
R34	QRD161J-104	CR	100 K 1/6 W
R35	QRD161J-103	CR	10 K 1/6 W
R36	QRD161J-103	CR	10 K 1/6 W
R37	QRD161J-103	CR	10 K 1/6 W
R38	QRD161J-102	CR	1 K 1/6 W
R39	QRD161J-473	CR	47 K 1/6 W
R40	QRD161J-473	CR	47 K 1/6 W
R41	QRD161J-473	CR	47 K 1/6 W
R42	QRD161J-473	CR	47 K 1/6 W
R43	QRD161J-473	CR	47 K 1/6 W
R44	QRD161J-473	CR	47 K 1/6 W
R45	QRD161J-473	CR	47 K 1/6 W
R47	QRD161J-473	CR	47 K 1/6 W
R48	QRD161J-473	CR	47 K 1/6 W
R49	QRD161J-473	CR	47 K 1/6 W
R50	QRD161J-473	CR	47 K 1/6 W
R51	QRD161J-473	CR	47 K 1/6 W
R52	QRD161J-473	CR	47 K 1/6 W
R53	QRD161J-473	CR	47 K 1/6 W
R54	QRD161J-102	CR	1 K 1/6 W
R55	QRD161J-102	CR	1 K 1/6 W
R56	QRD161J-104	CR	100 K 1/6 W
R57	QRD161J-104	CR	100 K 1/6 W
R58	QRD161J-222	CR	2.2 K 1/6 W
R59	QRD161J-222	CR	2.2 K 1/6 W
R60	QRD161J-104	CR	100 K 1/6 W
R61	QRD161J-104	CR	100 K 1/6 W
R62	QRD161J-473	CR	47 K 1/6 W
R63	QRD161J-473	CR	47 K 1/6 W
R64	QRD161J-473	CR	47 K 1/6 W
R65	QRD161J-473	CR	47 K 1/6 W
R66	QRD161J-473	CR	47 K 1/6 W
R67	QRD161J-473	CR	47 K 1/6 W
R68	QRD161J-473	CR	47 K 1/6 W
R69	QRD161J-473	CR	47 K 1/6 W
R70	QRD161J-473	CR	47 K 1/6 W
R71	QRD161J-473	CR	47 K 1/6 W
R72	QRD161J-562	CR	5.6 K 1/6 W
R73	QRD161J-562	CR	5.6 K 1/6 W
R74	QRD161J-102	CR	1 K 1/6 W
R75	QRD161J-104	CR	100 K 1/6 W
R76	QRD161J-104	CR	100 K 1/6 W
R77	QRD161J-104	CR	100 K 1/6 W
R78	QRD161J-103	CR	10 K 1/6 W
R79	QRD161J-103	CR	10 K 1/6 W
R80	QRD161J-103	CR	10 K 1/6 W
R81	QRD161J-473	CR	47 K 1/6 W
R82	QRD161J-473	CR	47 K 1/6 W
R83	QRD161J-473	CR	47 K 1/6 W
R84	QRD161J-473	CR	47 K 1/6 W
R85	QRD161J-473	CR	47 K 1/6 W
R86	QRD161J-473	CR	47 K 1/6 W
R87	QRD161J-473	CR	47 K 1/6 W
R88	QRD161J-473	CR	47 K 1/6 W
R89	QRD161J-473	CR	47 K 1/6 W
R90	QRD161J-473	CR	47 K 1/6 W
R91	QRD161J-562	CR	5.6 K 1/6 W
R92	QRD161J-562	CR	5.6 K 1/6 W
R93	QRD161J-102	CR	1 K 1/6 W
R94	QRD161J-104	CR	100 K 1/6 W
R95	QRD161J-104	CR	100 K 1/6 W
R96	QRD161J-104	CR	100 K 1/6 W
R97	QRD161J-103	CR	10 K 1/6 W
R98	QRD161J-103	CR	10 K 1/6 W
R99	QRD161J-103	CR	10 K 1/6 W
R100	QRD161J-473	CR	47 K 1/6 W
R101	QRD161J-473	CR	47 K 1/6 W
R102	QRD161J-473	CR	47 K 1/6 W
R103	QRD161J-473	CR	47 K 1/6 W
R104	QRD161J-473	CR	47 K 1/6 W
R105	QRD161J-473	CR	47 K 1/6 W
R106	QRD161J-473	CR	47 K 1/6 W
R107	QRD161J-473	CR	47 K 1/6 W
R108	QRD161J-562	CR	5.6 K 1/6 W
R109	QRD161J-562	CR	5.6 K 1/6 W
R110	QRD161J-102	CR	1 K 1/6 W
R111	QRD161J-104	CR	100 K 1/6 W
R112	QRD161J-104	CR	100 K 1/6 W
R113	QRD161J-104	CR	100 K 1/6 W
R114	QRD161J-103	CR	10 K 1/6 W
R115	QRD161J-103	CR	10 K 1/6 W
R116	QRD161J-103	CR	10 K 1/6 W
R117	QRD161J-473	CR	47 K 1/6 W
R118	QRD161J-473	CR	7 K 1/6 W
R119	QRD161J-473	CR	47 K 1/6 W
R120	QRD161J-473	CR	47 K 1/6 W

Symbol No.	Part No.	Part Name	Description	
R121	QRD161J-473	CR	47 K	1/6 W
R122	QRD161J-473	CR	47 K	1/6 W
R123	QRD161J-473	CR	47 K	1/6 W
R124	QRD161J-473	CR	47 K	1/6 W
R125	QRD161J-562	CR	5.6 K	1/6 W
R126	QRD161J-562	CR	5.6 K	1/6 W
R127	QRD161J-102	CR	1 K	1/6 W
R128	QRD161J-104	CR	100 K	1/6 W
R129	QRD161J-104	CR	100 K	1/6 W
R130	QRD161J-104	CR	100 K	1/6 W
R131	QRD161J-103	CR	10 K	1/6 W
R132	QRD161J-103	CR	10 K	1/6 W
R133	QRD161J-103	CR	10 K	1/6 W
R134	QRD161J-472	CR	4.7 K	1/6 W
R135	QRD161J-472	CR	4.7 K	1/6 W
R136	QRD161J-472	CR	4.7 K	1/6 W
R137	QRD161J-472	CR	4.7 K	1/6 W
R138	QRD161J-472	CR	4.7 K	1/6 W
R139	QRD161J-472	CR	4.7 K	1/6 W
R140	QRD161J-472	CR	4.7 K	1/6 W
R141	QRD161J-104	CR	100 K	1/6 W
R142	QRD161J-472	CR	4.7 K	1/6 W
R143	QRD161J-472	CR	4.7 K	1/6 W
R144	QRD161J-103	CR	10 K	1/6 W
R145	QRD161J-472	CR	4.7 K	1/6 W
R146	QRD161J-103	CR	10 K	1/6 W
R147	QRD161J-103	CR	10 K	1/6 W
R148	QRD161J-472	CR	4.7 K	1/6 W
R149	QRD161J-472	CR	4.7 K	1/6 W
R150	QRD161J-472	CR	4.7 K	1/6 W
R152	QRD161J-472	CR	4.7 K	1/6 W
R153	QRD161J-472	CR	4.7 K	1/6 W
R154	QRD161J-472	CR	4.7 K	1/6 W
R155	QRD161J-472	CR	4.7 K	1/6 W
R156	QRD161J-102	CR	1 K	1/6 W
R157	QRD161J-103	CR	10 K	1/6 W
R158	QRD161J-103	CR	10 K	1/6 W
R159	QRD161J-103	CR	10 K	1/6 W
R160	QRD161J-820	CR	82	1/6 W
R161	QRD161J-472	CR	4.7 K	1/6 W
R165	QRD161J-103	CR	10 K	1/6 W
R166	QRD161J-103	CR	10 K	1/6 W
R167	QRD161J-103	CR	10 K	1/6 W
R168	QRD161J-472	CR	4.7 K	1/6 W
C1	QCZ0206-104	C Cap	0.1	
C2	QER41CM-476	E Cap	47	16 V
C3	QEJ41VM-105	TT Cap	1	35 V
C4	QCZ0206-104	C Cap	0.1	
C6	QER41CM-476	E Cap	47	16 V
C7	QCF11HP-103	C Cap	0.01	50 V
C9	QER41EM-106	E Cap	10	25 V
C10	QER41EM-106	E Cap	10	25 V
C12	QCF11HP-103	C Cap	0.01	50 V
C13	QER41CM-476	E Cap	47	16 V
C14	QCZ0206-104	C Cap	0.1	

Symbol No.	Part No.	Part Name	Description	
C15	QCZ0206-104	C Cap	0.1	
C16	QER41EM-106	E Cap	10	25 V
C17	QER41EM-106	E Cap	10	25 V
C18	QER41EM-106	E Cap	10	25 V
C19	QCF11HP-103	C Cap	0.01	50 V
C20	QER41CM-476	E Cap	47	16 V
C21	QER41EM-106	E Cap	10	25 V
C22	QCZ0206-104	C Cap	0.1	
C24	QFN41HJ-103	MY Cap	0.1	50 V
C25	QFN41HJ-103	MY Cap	0.1	50 V
C26	QCF11HP-103	C Cap	0.1	50 V
C28	QER41CM-476	E Cap	47	16 V
C29	QCZ0206-104	C Cap	0.1	
C30	QCF11HP-103	C Cap	0.01	50 V
C31	QCF11HP-103	C Cap	0.01	50 V
C32	QCF11HP-103	C Cap	0.01	50 V
C33	QCF11HP-103	C Cap	0.01	50 V
C34	QCF11HP-103	C Cap	0.01	50 V
C35	QFN41HJ-103	MY Cap	0.01	50 V
C36	QFN41HJ-392	MY Cap	3900 P	50 V
C37	QCF11HP-103	C Cap	0.01	50 V
C40	QER41CM-476	E Cap	47	16 V
C41	QER41CM-476	E Cap	47	16 V
C42	QEPA1HM-105	NP Cap	1	50 V
RA1	RKM10L103G	R Network	10 K x 10	
VR1	SCV1554-103	VR	COLOR HUE	
VR2	SCV1554-103	VR	COLOR SAT	
VR3	SCV1554-103	VR	COLOR LUM	
VR4	SCV1554-103	VR	DSK/BORDER HUE	
VR5	SCV1554-103	VR	DSK/BORDER SAT	
VR6	SCV1554-103	VR	DSK/BORDER LUM	
VR7	SCV1554-103	VR	CHROMA KEY SLICE	
VR8	SCV1554-103	VR	CHROMA KEY FINE	
VR9	SCV1554-103	VR	DSK SLKE	
VR10	SCV1554-103	VR	SUPER LEVEL	
VR11	SCV0293-001	Stick Control	POSITIONER	
VR15	SCV1554-103	VR	DSK LEVEL	
VR16	SCV1554-103	VR	TIME	
S1~S57	Refer to the section 4.1 -Ⓐ			
S58	QSL2218-111	Switch	DSK ON/OFF	
S59	QSL2218-111	Switch	DSK EDGE ON/ OFF	
S60	QSL2318-002	Switch	DSK NEGA/POSI/EXT	
S61	QSL2218-111	Switch	BORDER ON/OFF	
S62	QSL2318-002	Switch	N/N-R/R	
S63	QSL2218-111	Switch	POSITIONER ON/OFF	
S64	SCV1555-001	Switch	SOFTNESS	
S65	SCV1555-001	Switch	CHROMA KEY COARSE	
S66	Refer to the section 4.1 -Ⓐ			
S67	–	–		
S68	QSL2318-002	Switch	CHROMA KEY MIX, SE/OFF/MIX	

Symbol No.	Part No.	Part Name	Description
S69	QSL2318-002	Switch	COLOR/OFF/COLOR BARS
S70	QSL2218-111	Switch	AUTO/MANU
S71	QSL2218-002	Switch	AUTO MIX, SE/MIX/DSK
S72	QSL2318-111	Switch	SUPER FADE/CUT
S73	QSL2218-111	Switch	SUPER ON/OFF
CN1	SS31053-040	Connector	
CN2	SS31053-040	Connector	
CN3	SS31053-030	Connector	
CN4	SS30662-003	Connector	
CN5	SS30662-003	Connector	
CN6	SS30662-003	Connector	

6.2 LB board assembly 01

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Symbol No.	Part No.	Part Name	Description
IC1	TC4081BP	IC	TOSHIBA
IC2	TD62504P	IC	TOSHIBA
IC3	TC4538BP	IC	TOSHIBA
IC4	TC4011BP	IC	TOSHIBA
IC5	NJM2903D	IC	JRC
IC6	NJM2903D	IC	JRC
IC7	NJM2903D	IC	JRC
IC8	NJM4558D	IC	JRC
IC9	AN6914	IC	MATSUSHITA
IC10	LR74HC245	IC	SHARP
IC11	TC4099BP	IC	TOSHIBA
IC12	TC4099BP	IC	TOSHIBA
IC13	LR74HC245	IC	SHARP
IC14	TA78L005AP	IC	TOSHIBA
IC15	TC4011BP	IC	TOSHIBA
IC16	TC4049BP	IC	TOSHIBA
IC17	TC4030BP	IC	TOSHIBA
IC18	TC4013BAP	IC	TOSHIBA
IC19	TC4029BP	IC	TOSHIBA
IC20	TC4029BP	IC	TOSHIBA
IC21	TC4011BP	IC	TOSHIBA
IC22	TC4011BP	IC	TOSHIBA
IC23	TC4053BP	IC	TOSHIBA
IC24	TC4053BP	IC	TOSHIBA
IC25	TC4069UBP	IC	TOSHIBA
IC26	TC4030BP	IC	TOSHIBA
IC27	TC4024BP	IC	TOSHIBA
IC28	TC4071BP	IC	TOSHIBA
IC29	TC40H004P	IC	TOSHIBA
IC30	TC4538BP	IC	TOSHIBA
IC31	TC4053BP	IC	TOSHIBA
IC32	TC4042BP	IC	TOSHIBA
IC33	TC4042BP	IC	TOSHIBA
IC34	TC4051BP	IC	TOSHIBA
IC35	TC4515BP	IC	TOSHIBA
IC36	TC4049BP	IC	TOSHIBA
IC37	TC4081BP	IC	TOSHIBA
IC38	TC4019BP	IC	TOSHIBA
IC39	TC4013BAP	IC	TOSHIBA
IC40	TC4013BAP	IC	TOSHIBA
IC41	TC4049BP	IC	TOSHIBA
IC42	TC4053BP	IC	TOSHIBA
IC43	TC4042BP	IC	TOSHIBA
IC44	TC4042BP	IC	TOSHIBA
IC45	TC4001BP	IC	TOSHIBA
IC46	TC4051BP	IC	TOSHIBA
IC47	TC4042BP	IC	TOSHIBA
IC48	TC4051BP	IC	TOSHIBA
IC49	TC4051BP	IC	TOSHIBA
IC50	TC4042BP	IC	TOSHIBA
IC51	TC4072BP	IC	TOSHIBA
IC52	HD75189P	IC	HITACHI
IC53	HD75189P	IC	HITACHI
IC54	HD75188P	IC	HITACHI
IC55	TC4071BP	IC	TOSHIBA
IC56	TC4053BP	IC	TOSHIBA
IC57	TC4042BP	IC	TOSHIBA
IC58	TC4042BP	IC	TOSHIBA
IC59	TC4011BP	IC	TOSHIBA
IC60	TC4051BP	IC	TOSHIBA

Symbol No.	Part No.	Part Name	Description
IC61	TC4051BP	IC	TOSHIBA
IC62	TC4051BP	IC	TOSHIBA
IC63	TC4051BP	IC	TOSHIBA
IC64	TC4051BP	IC	TOSHIBA
IC65	TC4051BP	IC	TOSHIBA
IC66	TC4081BP	IC	TOSHIBA
IC67	TC4042BP	IC	TOSHIBA
IC68	TC4042BP	IC	TOSHIBA
IC69	TC4023BP	IC	TOSHIBA
IC70	TC4051BP	IC	TOSHIBA
IC71	TC4051BP	IC	TOSHIBA
IC72	TC4051BP	IC	TOSHIBA
Q1	2SB856(C)	Transistor	HITACHI
Q2	2SD880(GR)	Transistor	TOSHIBA
Q3	2SD880(GR)	Transistor	TOSHIBA
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	MA165	Diode	MATSUSHITA
D7	MA165	Diode	MATSUSHITA
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	MA165	Diode	MATSUSHITA
D12	MA165	Diode	MATSUSHITA
D13	MA165	Diode	MATSUSHITA
D14	MA165	Diode	MATSUSHITA
D15	MA165	Diode	MATSUSHITA
D16	MA165	Diode	MATSUSHITA
D17	MA165	Diode	MATSUSHITA
D18	MA165	Diode	MATSUSHITA
D19	MA165	Diode	MATSUSHITA
D20	MA165	Diode	MATSUSHITA
D21	MA165	Diode	MATSUSHITA
D22	MA165	Diode	MATSUSHITA
D23	MA165	Diode	MATSUSHITA
D24	MA165	Diode	MATSUSHITA
D25	MA165	Diode	MATSUSHITA
D26	MA165	Diode	MATSUSHITA
D27	MA165	Diode	MATSUSHITA
D28	MA165	Diode	MATSUSHITA
D29	MA165	Diode	MATSUSHITA
D30	MA165	Diode	MATSUSHITA
D31	MA165	Diode	MATSUSHITA
D32	MA165	Diode	MATSUSHITA
D33	MA165	Diode	MATSUSHITA
D34	MA165	Diode	MATSUSHITA
D35	MA165	Diode	MATSUSHITA
D36	MA165	Diode	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
D37	MA165	Diode	MATSUSHITA
D38	MA165	Diode	MATSUSHITA
D39	MA165	Diode	MATSUSHITA
D40	MA165	Diode	MATSUSHITA
D41	MA165	Diode	MATSUSHITA
D42	MA165	Diode	MATSUSHITA
D43	MA165	Diode	MATSUSHITA
D44	MA165	Diode	MATSUSHITA
D45	MA165	Diode	MATSUSHITA
D46	MA165	Diode	MATSUSHITA
D47	MA165	Diode	MATSUSHITA
D48	MA165	Diode	MATSUSHITA
D49	MA165	Diode	MATSUSHITA
D50	MA165	Diode	MATSUSHITA
D51	MA165	Diode	MATSUSHITA
D52	MA165	Diode	MATSUSHITA
D53	MA165	Diode	MATSUSHITA
D54	MA165	Diode	MATSUSHITA
D55	MA165	Diode	MATSUSHITA
D56	MA165	Diode	MATSUSHITA
D57	MA165	Diode	MATSUSHITA
D58	MA165	Diode	MATSUSHITA
D59	MA165	Diode	MATSUSHITA
D60	MA165	Diode	MATSUSHITA
D61	MA165	Diode	MATSUSHITA
D62	MA165	Diode	MATSUSHITA
D63	MA165	Diode	MATSUSHITA
D64	MA165	Diode	MATSUSHITA
D65	MA165	Diode	MATSUSHITA
D66	MA165	Diode	MATSUSHITA
D67	MA165	Diode	MATSUSHITA
D68	MA165	Diode	MATSUSHITA
D69	MA165	Diode	MATSUSHITA
D70	MA165	Diode	MATSUSHITA
D71	MA165	Diode	MATSUSHITA
D72	MA165	Diode	MATSUSHITA
D73	MA165	Diode	MATSUSHITA
D74	MA165	Diode	MATSUSHITA
D75	MA165	Diode	MATSUSHITA
D76	MA165	Diode	MATSUSHITA
D77	MA165	Diode	MATSUSHITA
D78	MA165	Diode	MATSUSHITA
D79	MA165	Diode	MATSUSHITA
D80	MA165	Diode	MATSUSHITA
D81	MA165	Diode	MATSUSHITA
D82	MA165	Diode	MATSUSHITA
D83	MA165	Diode	MATSUSHITA
D84	MA165	Diode	MATSUSHITA
D85	MA165	Diode	MATSUSHITA
D86	MA165	Diode	MATSUSHITA
D87	MA165	Diode	MATSUSHITA
D88	MA165	Diode	MATSUSHITA
D89	MA165	Diode	MATSUSHITA
D90	MA165	Diode	MATSUSHITA
D91	MA165	Diode	MATSUSHITA
D92	MA165	Diode	MATSUSHITA
D93	MA165	Diode	MATSUSHITA
D94	MA165	Diode	MATSUSHITA
D95	MA165	Diode	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
D96	MA165	Diode	MATSUSHITA
D97	MA165	Diode	MATSUSHITA
D98	MA165	Diode	MATSUSHITA
D99	MA165	Diode	MATSUSHITA
D100	MA165	Diode	MATSUSHITA
D101	MA165	Diode	MATSUSHITA
R1	QRD161J-474	CR	470 K 1/6 W
R2	QRD161J-474	CR	470 K 1/6 W
R3	QRD161J-474	CR	470 K 1/6 W
R4	QRD161J-474	CR	470 K 1/6 W
R5	QRD161J-474	CR	470 K 1/6 W
R6	QRD161J-474	CR	470 K 1/6 W
R7	QRD161J-474	CR	470 K 1/6 W
R8	QRD161J-474	CR	470 K 1/6 W
R9	QRD161J-472	CR	4.7 K 1/6 W
R10	QRD161J-472	CR	4.7 K 1/6 W
R11	QRD161J-474	CR	470 K 1/6 W
R12	QRD161J-474	CR	470 K 1/6 W
R13	QRD161J-474	CR	470 K 1/6 W
R14	QRD161J-474	CR	470 K 1/6 W
R15	QRD161J-473	CR	47 K 1/6 W
R16	QRD161J-103	CR	10 K 1/6 W
R17	QVPB613-104	VR	100 K
R18	QRD161J-223	CR	22 K 1/6 W
R19	QRD161J-473	CR	47 K 1/6 W
R20	QRD161J-103	CR	10 K 1/6 W
R21	QRD161J-103	CR	10 K 1/6 W
R22	QRD161J-474	CR	470 K 1/6 W
R23	QRD161J-474	CR	470 K 1/6 W
R24	QRD161J-474	CR	470 K 1/6 W
R25	QRD161J-474	CR	470 K 1/6 W
R26	QRD161J-473	CR	47 K 1/6 W
R27	QRD161J-103	CR	10 K 1/6 W
R28	QRD161J-103	CR	10 K 1/6 W
R29	QVPB613-104	VR	100 K
R30	QRD161J-223	CR	22 K 1/6 W
R31	QRD161J-473	CR	47 K 1/6 W
R32	QRD161J-103	CR	10 K 1/6 W
R33	QRD161J-103	CR	10 K 1/6 W
R34	QRD161J-223	CR	22 K 1/6 W
R35	QRD161J-103	CR	10 K 1/6 W
R36	QRD161J-102	CR	1 K 1/6 W
R37	QRD161J-104	CR	100 K 1/6 W
R38	QRD161J-474	CR	470 K 1/6 W
R39	QRD161J-474	CR	470 K 1/6 W
R40	QRD161J-474	CR	470 K 1/6 W
R41	QRD161J-474	CR	470 K 1/6 W
R42	QRD161J-474	CR	470 K 1/6 W
R43	QRD161J-474	CR	470 K 1/6 W
R44	QRD161J-103	CR	10 K 1/6 W
R45	QRD161J-473	CR	47 K 1/6 W
R46	QRD161J-472	CR	4.7 K 1/6 W
R47	QRD161J-103	CR	10 K 1/6 W
R48	QRD161J-473	CR	47 K 1/6 W
R49	QRD161J-472	CR	4.7 K 1/6 W
R50	QRD161J-104	CR	100 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R51	QRD161J-104	CR	100 K 1/6 W
R52	QRD161J-103	CR	10 K 1/6 W
R53	QRD161J-103	CR	10 K 1/6 W
R54	QVPB613-501	VR	500
R55	QRD161J-103	CR	10 K 1/6 W
R56	QRD161J-103	CR	10 K 1/6 W
R57	QRD161J-103	CR	10 K 1/6 W
R58	QRD161J-474	CR	470 K 1/6 W
R59	QRD161J-474	CR	470 K 1/6 W
R60	QRD161J-474	CR	470 K 1/6 W
R61	QRD161J-474	CR	470 K 1/6 W
R62	QRD161J-474	CR	470 K 1/6 W
R63	QRD161J-474	CR	470 K 1/6 W
R64	QRD161J-474	CR	470 K 1/6 W
R65	QRD161J-474	CR	470 K 1/6 W
R66	QRD161J-474	CR	470 K 1/6 W
R67	QRD161J-474	CR	470 K 1/6 W
R68	QRD161J-474	CR	470 K 1/6 W
R69	QRD161J-474	CR	470 K 1/6 W
R70	QRD161J-474	CR	470 K 1/6 W
R71	QRD161J-474	CR	470 K 1/6 W
R72	QRD161J-474	CR	470 K 1/6 W
R73	QRD161J-474	CR	470 K 1/6 W
R74	QRD161J-103	CR	10 K 1/6 W
R75	QRD161J-473	CR	47 K 1/6 W
R76	QRD161J-473	CR	47 K 1/6 W
R77	QRD161J-473	CR	47 K 1/6 W
R78	QRD161J-473	CR	470 K 1/6 W
R79	QRD161J-103	CR	10 K 1/6 W
R80	QRD161J-473	CR	47 K 1/6 W
R81	QRD161J-472	CR	4.7 K 1/6 W
R82	QRD161J-103	CR	10 K 1/6 W
R83	QRD161J-473	CR	47 K 1/6 W
R84	QRD161J-472	CR	4.7 K 1/6 W
R85	QRD161J-103	CR	10 K 1/6 W
R86	QRD161J-473	CR	47 K 1/6 W
R87	QRD161J-472	CR	4.7 K 1/6 W
R88	QRD161J-103	CR	10 K 1/6 W
R89	QRD161J-473	CR	47 K 1/6 W
R90	QRD161J-472	CR	4.7 K 1/6 W
R91	QRD161J-102	CR	1 K 1/6 W
R92	QRD161J-102	CR	1 K 1/6 W
R93	QRD161J-102	CR	1 K 1/6 W
R94	QRD161J-102	CR	1 K 1/6 W
R95	QRD161J-102	CR	1 K 1/6 W
R96	QRD161J-102	CR	1 K 1/6 W
R97	QRD161J-102	CR	1 K 1/6 W
R98	QRD161J-102	CR	1 K 1/6 W
R99	QRD161J-102	CR	1 K 1/6 W
R100	QRD161J-102	CR	1 K 1/6 W
R101	QRD161J-102	CR	1 K 1/6 W
R102	QRD161J-102	CR	1 K 1/6 W
R103	QRD161J-472	CR	4.7 K 1/6 W
R104	QRD161J-472	CR	4.7 K 1/6 W
R105	QRD161J-472	CR	4.7 K 1/6 W
R106	QRD161J-472	CR	4.7 K 1/6 W
R107	QRD161J-472	CR	4.7 K 1/6 W
R108	QRD161J-472	CR	4.7 K 1/6 W
R109	QRD161J-472	CR	4.7 K 1/6 W
R110	QRD161J-472	CR	4.7 K 1/6 W

Symbol No.	Part No.	Part Name	Description	
R111	QRD161J-104	CR	100 K	1/6 W
R112	QRD161J-332	CR	3.3 K	1/6 W
R113	QRD161J-332	CR	3.3 K	1/6 W
R114	QRD161J-104	CR	100 K	1/6 W
R115	QRD161J-473	CR	47 K	1/6 W
R116	QRD161J-473	CR	47 K	1/6 W
R117	QRD161J-473	CR	47 K	1/6 W
R118	QRD161J-473	CR	47 K	1/6 W
R119	QRD161J-473	CR	47 K	1/6 W
R120	QRD161J-473	CR	47 K	1/6 W
R121	QRD161J-473	CR	47 K	1/6 W
R122	QRD161J-473	CR	47 K	1/6 W
R123	QRD161J-102	CR	1 K	1/6 W
R124	QRD161J-391	CR	390	1/6 W
R125	QRD161J-822	CR	8.2 K	1/6 W
R126	QRD161J-391	CR	390	1/6 W
R127	QRD161J-391	CR	390	1/6 W
R128	QRD161J-822	CR	8.2 K	1/6 W
R129	QRD161J-391	CR	390	1/6 W
R130	QRD161J-391	CR	390	1/6 W
R131	QRD161J-822	CR	8.2 K	1/6 W
R132	QRD161J-391	CR	390	1/6 W
R133	QRD161J-102	CR	1 K	1/6 W
R134	QRD161J-102	CR	1 K	1/6 W
R135	QRD161J-103	CR	10 K	1/6 W
R136	QRD161J-682	CR	6.8 K	1/6 W
R137	QRD161J-472	CR	4.7 K	1/6 W
R138	QRD161J-822	CR	8.2 K	1/6 W
R139	QRD161J-103	CR	10 K	1/6 W
R140	QRD161J-103	CR	10 K	1/6 W
R141	QRD161J-103	CR	10 K	1/6 W
R142	QRD161J-103	CR	10 K	1/6 W
R143	QRD161J-103	CR	10 K	1/6 W
R144	QRD161J-103	CR	10 K	1/6 W
R145	QRD161J-103	CR	10 K	1/6 W
R146	QRD161J-103	CR	10 K	1/6 W
R147	QRD161J-331	CR	330	1/6 W
R148	QRD161J-331	CR	330	1/6 W
R149	QRD161J-331	CR	330	1/6 W
R150	QRD161J-331	CR	330 K	1/6 W
R151	QRD161J-102	CR	1 K	1/6 W
R152	QRD161J-102	CR	1 K	1/6 W
R153	QRD161J-102	CR	1 K	1/6 W
R154	QRD161J-102	CR	1 K	1/6 W
R155	QRD161J-103	CR	10 K	1/6 W
R160	QRD161J-473	CR	47 K	1/6 W
C1	QCS11HJ-221	C Cap	220 P	50 V
C2	QFN41HJ-223	MY Cap	0.022	50 V
C3	QCS11HJ-221	C Cap	220 P	50 V
C4	QCS11HJ-221	C Cap	220 P	50 V
C5	QFN41HJ-223	MY Cap	0.022	50 V
C6	QCS11HJ-221	C Cap	220 P	50 V
C7	QER41HM-225	E Cap	2.2	50 V
C8	QCZ0206-104	C Cap	0.1	
C9	QCZ0206-104	C Cap	0.1	
C10	QEPC1CM-106	E Cap	10	16 V

Symbol No.	Part No.	Part Name	Description	
C11	QCS11HJ-221	C Cap	220 P	50 V
C12	QCS11HJ-221	C Cap	220 P	50 V
C13	QFN41HJ-103	MY Cap	0.01	50 V
C14	QFN41HJ-103	MY Cap	0.01	50 V
C15	QCS11HJ-221	C Cap	220 P	50 V
C16	QCS11HJ-221	C Cap	220 P	50 V
C17	QCS11HJ-221	C Cap	220 P	50 V
C18	QCS11HJ-221	C Cap	220 P	50 V
C19	QER41CM-476	E Cap	47	16 V
C20	QCZ0206-104	C Cap	0.1	
C21	QER41CM-476	E Cap	47	16 V
C22	QER41CM-476	E Cap	47	16 V
C23	QFN41HJ-473	MY Cap	0.043	50 V
C24	QFN41HJ-103	MY Cap	0.01	50 V
C25	QFN41HJ-103	MY Cap	0.01	50 V
C26	QFN41HJ-103	MY Cap	0.01	50 V
C27	QFN41HJ-102	MY Cap	1000 P	50 V
C28	QER41CM-476	E Cap	47	16 V
C29	QER41CM-476	E Cap	47	16 V
C30	QER41CM-476	E Cap	47	16 V
C31	QER41CM-476	E Cap	47	16 V
C32	QER41CM-476	E Cap	47	16 V
C33	QER41CM-476	E Cap	47	16 V
C34	QER41CM-476	E Cap	47	16 V
C35	QER41CM-476	E Cap	47	16 V
C36	QER41CM-476	E Cap	47	16 V
C37	QCF11HP-103	C Cap	0.01	50 V
C38	QCF11HP-103	C Cap	0.01	50 V
C39	QCF11HP-103	C Cap	0.01	50 V
C40	QCF11HP-103	C Cap	0.01	50 V
C41	QCF11HP-103	C Cap	0.01	50 V
C42	QCF11HP-103	C Cap	0.01	50 V
C43	QCF11HP-103	C Cap	0.01	50 V
C44	QCF11HP-103	C Cap	0.01	50 V
C45	QCF11HP-103	C Cap	0.01	50 V
C46	QCF11HP-103	C Cap	0.01	50 V
C47	QCF11HP-103	C Cap	0.01	50 V
C48	QCF11HP-103	C Cap	0.01	50 V
C49	QCF11HP-103	C Cap	0.01	50 V
C50	QCF11HP-103	C Cap	0.01	50 V
C51	QCF11HP-103	C Cap	0.01	50 V
C52	QCF11HP-103	C Cap	0.01	50 V
C53	QCF11HP-103	C Cap	0.01	50 V
C54	QCF11HP-103	C Cap	0.01	50 V
C55	QCF11HP-103	C Cap	0.01	50 V
C56	QCF11HP-103	C Cap	0.01	50 V
C57	QCF11HP-103	C Cap	0.01	50 V
C58	QCF11HP-103	C Cap	0.01	50 V
C59	QCF11HP-103	C Cap	0.01	50 V
C60	QCF11HP-103	C Cap	0.01	50 V
C61	QCF11HP-103	C Cap	0.01	50 V
C62	QCF11HP-103	C Cap	0.01	50 V
C63	QCF11HP-103	C Cap	0.01	50 V
C64	QCF11HP-103	C Cap	0.01	50 V
C65	QCF11HP-103	C Cap	0.01	50 V
C66	QCF11HP-103	C Cap	0.01	50 V
C67	QCF11HP-103	C Cap	0.01	50 V
C68	QCF11HP-103	C Cap	0.01	50 V
C69	QCF11HP-103	C Cap	0.01	50 V
C70	QCF11HP-103	C Cap	0.01	50 V

Symbol No.	Part No.	Part Name	Description
C71	QCF11HP-103	C Cap	0.01 50 V
C72	QCF11HP-103	C Cap	0.01 50 V
C73	QCF11HP-103	C Cap	0.01 50 V
C74	QCF11HP-103	C Cap	0.01 50 V
C75	QCF11HP-103	C Cap	0.01 50 V
C76	QCF11HP-103	C Cap	0.01 50 V
C77	QCF11HP-103	C Cap	0.01 50 V
C78	QCF11HP-103	C Cap	0.01 50 V
C79	QCF11HP-103	C Cap	0.01 50 V
C80	QCF11HP-103	C Cap	0.01 50 V
C81	QCF11HP-103	C Cap	0.01 50 V
C82	QCF11HP-103	C Cap	0.01 50 V
C83	QCF11HP-103	C Cap	0.01 50 V
C84	QCF11HP-103	C Cap	0.01 50 V
C85	QCF11HP-103	C Cap	0.01 50 V
C86	QCF11HP-103	C Cap	0.01 50 V
C87	QCF11HP-103	C Cap	0.01 50 V
C88	QCF11HP-103	C Cap	0.01 50 V
C89	QCF11HP-103	C Cap	0.01 50 V
C90	QCF11HP-103	C Cap	0.01 50 V
C91	QCF11HP-103	C Cap	0.01 50 V
C92	QCF11HP-103	C Cap	0.01 50 V
C93	QCF11HP-103	C Cap	0.01 50 V
C94	QCF11HP-103	C Cap	0.01 50 V
C95	QCF11HP-103	C Cap	0.01 50 V
C96	QCF11HP-103	C Cap	0.01 50 V
C97	QCF11HP-103	C Cap	0.01 50 V
C98	QCF11HP-103	C Cap	0.01 50 V
C99	QCF11HP-103	C Cap	0.01 50 V
C100	QCF11HP-103	C Cap	0.01 50 V
C101	QCF11HP-103	C Cap	0.01 50 V
C102	QCF11HP-103	C Cap	0.01 50 V
C103	QCF11HP-103	C Cap	0.01 50 V
C104	QCF11HP-103	C Cap	0.01 50 V
C105	QCF11HP-103	C Cap	0.01 50 V
C106	QCF11HP-103	C Cap	0.01 50 V
C107	QCF11HP-103	C Cap	0.01 50 V
C108	QCF11HP-103	C Cap	0.01 50 V
C109	QCF11HP-103	C Cap	0.01 50 V
C110	QCF11HP-103	C Cap	0.01 50 V
C111	QCF11HP-103	C Cap	0.01 50 V
C112	QCF11HP-103	C Cap	0.01 50 V
C113	QCF11HP-103	C Cap	0.01 50 V
C114	QCF11HP-103	C Cap	0.01 50 V
C115	QCF11HP-103	C Cap	0.01 50 V
C116	QCF11HP-103	C Cap	0.01 50 V
C117	QCF11HP-103	C Cap	0.01 50 V
C118	QCF11HP-103	C Cap	0.01 50 V
C119	QCF11HP-103	C Cap	0.01 50 V
C120	QCF11HP-103	C Cap	0.01 50 V
C121	QCF11HP-103	C Cap	0.01 50 V
C122	QCF11HP-103	C Cap	0.01 50 V
C123	QCF11HP-103	C Cap	0.01 50 V
C124	QCF11HP-103	C Cap	0.01 50 V
C125	QCF11HP-103	C Cap	0.01 50 V
C126	QCF11HP-103	C Cap	0.01 50 V
C127	QCF11HP-103	C Cap	0.01 50 V
C128	QCF11HP-103	C Cap	0.01 50 V
C129	QCF11HP-103	C Cap	0.01 50 V
C130	QCF11HP-103	C Cap	0.01 50 V

Symbol No.	Part No.	Part Name	Description
C131	QCF11HP-103	C Cap	0.01 50 V
C132	QCF11HP-103	C Cap	0.01 50 V
C133	QCF11HP-103	C Cap	0.01 50 V
C134	QCF11HP-103	C Cap	0.01 50 V
C135	QCF11HP-103	C Cap	0.01 50 V
C140	QEPA1HM-105	NP Cap	1 50 V
RA1	RKM10L103G	R Network	10 K x 10
RA1	RKM10L103G	R Network	10 K x 10
CN1	SS31054-040	Connector	40 Pin
CN2	SS31054-040	Connector	40 Pin
CN3	SS31054-030	Connector	30 Pin
CN4	SCV1556-037	Connector	37 Pin

6.3 VIDEO board assembly 03

03□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	MC1495L	IC	MOTOROLA
IC2	MC1495L	IC	MOTOROLA
IC3	NJM4560DD	IC	JRC
IC4	MC1495L	IC	MOTOROLA
IC5	MC1495L	IC	MOTOROLA
IC6	MC1495L	IC	MOTOROLA
IC7	MC1495L	IC	MOTOROLA
IC8	TC4099BP	IC	TOSHIBA
IC9	TC74HC373P	IC	TOSHIBA
IC10	LR74HC245	IC	SHARP
IC11	TC40H004P	IC	TOSHIBA
IC12	NJM4560DD	IC	JRC
IC13	TC4053BP	IC	TOSHIBA
Q2	2SC1685(R)	Transistor	MATSUSHITA
Q3	2SK163(M, N)	FET	NEC
Q4	2SC1685(R)	Transistor	MATSUSHITA
Q5	2SA564(R)	Transistor	MATSUSHITA
Q7	2SC1685(R)	Transistor	MATSUSHITA
Q8	2SK163(M, N)	FET	NEC
Q9	2SC1685(R)	Transistor	MATSUSHITA
Q10	2SA564(R)	Transistor	MATSUSHITA
Q11	2SC1685(R)	Transistor	MATSUSHITA
Q12	2SC1685(R)	Transistor	MATSUSHITA
Q13	2SC1685(R)	Transistor	MATSUSHITA
Q14	2SC1685(R)	Transistor	MATSUSHITA
Q15	–	–	
Q16	2SC1685(R)	Transistor	MATSUSHITA
Q17	2SA564(R)	Transistor	MATSUSHITA
Q18	2SK163(M, N)	FET	NEC
Q19	2SC1685(R)	Transistor	MATSUSHITA
Q20	2SA564(R)	Transistor	MATSUSHITA
Q21	2SC1685(R)	Transistor	MATSUSHITA
Q22	2SC1685(R)	Transistor	MATSUSHITA
Q23	2SC1685(R)	Transistor	MATSUSHITA
Q25	2SC1685(R)	Transistor	MATSUSHITA
Q26	2SK163(M, N)	FET	NEC
Q27	2SC1685(R)	Transistor	MATSUSHITA
Q28	2SA564(R)	Transistor	MATSUSHITA
Q30	2SC1685(R)	Transistor	MATSUSHITA
Q31	2SK163(M, N)	FET	NEC
Q32	2SC1685(R)	Transistor	MATSUSHITA
Q33	2SA564(R)	Transistor	MATSUSHITA
Q36	2SC1685(R)	Transistor	MATSUSHITA
Q37	2SC1685(R)	Transistor	MATSUSHITA
Q38	2SC1685(R)	Transistor	MATSUSHITA
Q39	2SA564(R)	Transistor	MATSUSHITA
Q40	2SA564(R)	Transistor	MATSUSHITA
Q41	2SC1685(R)	Transistor	MATSUSHITA
Q42	2SC1685(R)	Transistor	MATSUSHITA
Q43	2SC1685(R)	Transistor	MATSUSHITA
Q44	2SC1685(R)	Transistor	MATSUSHITA
Q45	2SK163(M, N)	FET	NEC
Q46	2SC1685(R)	Transistor	MATSUSHITA
Q47	2SA564(R)	Transistor	MATSUSHITA
Q48	2SC1685(R)	Transistor	MATSUSHITA
Q49	2SC1685(R)	Transistor	MATSUSHITA
Q50	2SC1685(R)	Transistor	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
Q51	2SC1685(R)	Transistor	MATSUSHITA
Q52	2SC1685(R)	Transistor	MATSUSHITA
Q53	2SC1685(R)	Transistor	MATSUSHITA
Q54	2SC1685(R)	Transistor	MATSUSHITA
Q55	2SC1685(R)	Transistor	MATSUSHITA
Q56	2SC1685(R)	Transistor	MATSUSHITA
Q57	2SC1685(R)	Transistor	MATSUSHITA
Q58	2SC1685(R)	Transistor	MATSUSHITA
Q59	2SC1685(R)	Transistor	MATSUSHITA
Q60	2SA564(R)	Transistor	MATSUSHITA
Q61	2SC1685(R)	Transistor	MATSUSHITA
Q62	2SA564(R)	Transistor	MATSUSHITA
Q63	2SC1685(R)	Transistor	MATSUSHITA
Q64	2SC1685(R)	Transistor	MATSUSHITA
Q65	2SC1685(R)	Transistor	MATSUSHITA
Q66	2SC1685(R)	Transistor	MATSUSHITA
Q67	2SC1685(R)	Transistor	MATSUSHITA
Q68	2SC1685(R)	Transistor	MATSUSHITA
Q69	2SC1685(R)	Transistor	MATSUSHITA
Q70	2SA564(R)	Transistor	MATSUSHITA
Q71	2SC1685(R)	Transistor	MATSUSHITA
Q72	2SC1685(R)	Transistor	MATSUSHITA
Q73	2SK163(M, N)	FET	NEC
Q74	2SC1685(R)	Transistor	MATSUSHITA
Q75	2SA564(R)	Transistor	MATSUSHITA
Q76	2SA564(R)	Transistor	MATSUSHITA
Q77	2SA564(R)	Transistor	MATSUSHITA
Q78	2SC1685(R)	Transistor	MATSUSHITA
Q79	2SC1685(R)	Transistor	MATSUSHITA
Q80	2SC1685(R)	Transistor	MATSUSHITA
Q81	2SC1685(R)	Transistor	MATSUSHITA
Q82	2SA564(R)	Transistor	MATSUSHITA
Q90	2SC1685(R)	Transistor	MATSUSHITA
Q91	2SC1685(R)	Transistor	MATSUSHITA
Q92	2SA564(R)	Transistor	MATSUSHITA
Q93	2SA564(R)	Transistor	MATSUSHITA
Q94	2SK163(M, N)	FET	NEC
Q95	2SC1685(R)	Transistor	MATSUSHITA
Q100	2SK163(M.N)	FET	NEC
Q101	2SK163(M.N)	FET	NEC
Q102	2SK163(M.N)	FET	NEC
Q103	2SK163(M.N)	FET	NEC
Q104	2SK163(M.N)	FET	NEC
Q105	2SK163(M.N)	FET	NEC
Q106	2SK163(M.N)	FET	NEC
Q107	2SK163(M.N)	FET	NEC
Q108	2SK163(M.N)	FET	NEC
Q109	2SK163(M.N)	FET	NEC
D1	HZ11A3L	Zener Diode	HITACHI
D2	HZ11A3L	Zener Diode	HITACHI
D5	HZ11A3L	Zener Diode	HITACHI
D6	HZ11A3L	Zener Diode	HITACHI
D7	HZ11A3L	Zener Diode	HITACHI
D8	HZ12A3L	Zener Diode	HITACHI
D9	HZ11A3L	Zener Diode	HITACHI
D10	MA165	Diode	MATSUSHITA

Symbol No.	Part No.	Part Name	Description	
D11	MA165	Diode	MATSUSHITA	
R1	QRD161J-102	CR	1 K	1/6 W
R5	QRD161J-272	CR	2.7 K	1/6 W
R6	QRD161J-472	CR	4.7 K	1/6 W
R7	QRD161J-823	CR	82 K	1/6 W
R8	–	–		
R9	QRD161J-103	CR	10 K	1/6 W
R10	QRD161J-101	CR	100	1/6 W
R11	QRD161J-103	CR	10 K	1/6 W
R12	QRD161J-102	CR	1 K	1/6 W
R16	QRD161J-272	CR	2.7 K	1/6 W
R17	QRD161J-472	CR	4.7 K	1/6 W
R18	QRD161J-823	CR	82 K	1/6 W
R19	–	–		
R20	QRD161J-103	CR	10 K	1/6 W
R21	QRD161J-101	CR	100	1/6 W
R22	QRD161J-103	CR	10 K	1/6 W
R23	QRD161J-331	CR	330	1/6 W
R24	QRD161J-331	CR	330	1/6 W
R25	QRD161J-562	CR	5.6 K	1/6 W
R26	QRD161J-152	CR	1.5 K	1/6 W
R27	QRD161J-152	CR	1.5 K	1/6 W
R28	QRD161J-471	CR	470	1/6 W
R29	QRD161J-392	CR	3.9 K	1/6 W
R30	QRD161J-102	CR	1 K	1/6 W
R31	QVPB613-502	VR	5 K	
R32	QRD161J-103	CR	10 K	1/6 W
R33	QRD161J-562	CR	5.6 K	1/6 W
R34	QRD161J-272	CR	2.7 K	1/6 W
R35	QRD161J-101	CR	100	1/6 W
R36	QRD161J-101	CR	100	1/6 W
R37	QRD161J-560	CR	56	1/6 W
R38	QRD161J-560	CR	56	1/6 W
R39	QRD161J-272	CR	2.7 K	1/6 W
R40	QRD161J-682	CR	6.8 K	1/6 W
R41	QRD161J-102	CR	1 K	1/6 W
R42	QRD161J-101	CR	100	1/6 W
R43	QVPB613-501	VR	500	
R44	QRD161J-101	CR	100	1/6 W
R45	QRD161J-472	CR	4.7 K	1/6 W
R46	QRD161J-101	CR	100	1/6 W
R47	QVPB613-501	VR	500	1/6 W
R48	QRD161J-101	CR	100	1/6 W
R49	QRD161J-472	CR	4.7 K	1/6 W
R50	QRD161J-182	CR	1.8 K	1/6 W
R51	QRD161J-102	CR	1 K	1/6 W
R52	QRD161J-823	CR	82 K	1/6 W
R53	–	–		
R54	QRD161J-103	CR	10 K	1/6 W
R55	QRD161J-101	CR	100	1/6 W
R56	QRD161J-103	CR	10 K	1/6 W
R57	QRD161J-331	CR	330	1/6 W
R58	QRD161J-272	CR	2.7 K	1/6 W
R59	QRD161J-472	CR	4.7 K	1/6 W
R60	–	–		

Symbol No.	Part No.	Part Name	Description	
R61	QRD161J-823	CR	82 K	1/6 W
R62	QRD161J-103	CR	10 K	1/6 W
R63	QRD161J-101	CR	100	1/6 W
R64	QRD161J-103	CR	10 K	1/6 W
R65	QRD161J-331	CR	330	1/6 W
R66	QRD161J-102	CR	1 K	1/6 W
R67	QRD161J-562	CR	5.6 K	1/6 W
R68	QRD161J-152	CR	1.5 K	1/6 W
R69	QRD161J-152	CR	1.5 K	1/6 W
R70	QRD161J-471	CR	470	1/6 W
R71	QRD161J-392	CR	3.9 K	1/6 W
R72	QVPB613-502	VR	5 K	
R73	QRD161J-103	CR	10 K	1/6 W
R74	QRD161J-562	CR	5.6 K	1/6 W
R75	QRD161J-272	CR	2.7 K	1/6 W
R76	QRD161J-101	CR	100	1/6 W
R77	QRD161J-101	CR	100	1/6 W
R78	QRD161J-560	CR	56	1/6 W
R79	QRD161J-560	CR	56	1/6 W
R80	QRD161J-272	CR	2.7 K	1/6 W
R81	QRD161J-682	CR	6.8 K	1/6 W
R82	QRD161J-102	CR	1 K	1/6 W
R83	QRD161J-101	CR	100	1/6 W
R84	QVPB613-501	VR	500	1/6 W
R85	QRD161J-101	CR	100	1/6 W
R86	QRD161J-472	CR	4.7 K	1/6 W
R87	QRD161J-101	CR	100	1/6 W
R88	QVPB613-501	VR	500	
R89	QRD161J-101	CR	100	1/6 W
R90	QRD161J-472	CR	4.7 K	1/6 W
R91	QRD161J-182	CR	1.8 K	1/6 W
R92	QRD161J-0R0	CR	0	1/6 W
R101	QRD161J-102	CR	1 K	1/6 W
R102	QRD161J-472	CR	4.7 K	1/6 W
R103	–	–		
R104	QRD161J-823	CR	82 K	1/6 W
R106	QRD161J-101	CR	100	1/6 W
R107	QRD161J-272	CR	2.7 K	1/6 W
R108	QRD161J-103	CR	10 K	1/6 W
R109	QRD161J-822	CR	8.2 K	1/6 W
R110	QRD161J-680	CR	68	1/6 W
R111	QRD161J-680	CR	68	1/6 W
R112	QRD161J-332	CR	3.3 K	1/6 W
R113	QVPB613-501	VR	500	
R114	QRD161J-391	CR	390	1/6 W
R115	QRD161J-560	CR	56	1/6 W
R117	QRD161J-272	CR	2.7 K	1/6 W
R118	QRD161J-472	CR	4.7 K	1/6 W
R119	–	–		
R120	QRD161J-823	CR	82 K	1/6 W
R122	QVPB614-501	VR	500	
R123	QRD161J-101	CR	100	1/6 W
R124	QRD161J-272	CR	2.7 K	1/6 W
R125	QRD161J-103	CR	10 K	1/6 W
R126	QRD161J-391	CR	390	1/6 W
R127	QRD161J-560	CR	56	1/6 W
R129	QRD161J-102	CR	1 K	1/6 W
R130	–	–		

Symbol No.	Part No.	Part Name	Description
R131	–	–	
R132	QRD161J-183	CR	18 K 1/6 W
R133	QRD161J-393	CR	39 K 1/6 W
R134	QVPB613-502	VR	5 K
R135	QRD161J-123	CR	12 K 1/6 W
R136	QRD161J-101	CR	100 1/6 W
R137	QRD161J-272	CR	2.7 K 1/6 W
R138	QRD161J-472	CR	4.7 K 1/6 W
R139	–	–	
R140	QRD161J-823	CR	82 K 1/6 W
R141	QRD161J-101	CR	100 1/6 W
R142	QRD161J-103	CR	10 K 1/6 W
R143	QRD161J-472	CR	4.7 K 1/6 W
R144	QRD161J-472	CR	4.7 K 1/6 W
R145	QRD161J-101	CR	100 1/6 W
R146	QRD161J-822	CR	8.2 K 1/6 W
R147	QRD161J-472	CR	4.7 K 1/6 W
R148	QRD161J-472	CR	4.7 K 1/6 W
R149	QRD161J-102	CR	1 K 1/6 W
R150	QRD161J-272	CR	2.7 K 1/6 W
R151	QRD161J-472	CR	4.7 K 1/6 W
R152	–	–	
R153	QVPB614-501	VR	500
R154	QRD161J-103	CR	10 K 1/6 W
R155	QRD161J-101	CR	100 1/6 W
R156	QRD161J-561	CR	560 1/6 W
R157	QRD161J-561	CR	560 1/6 W
R158	QRD161J-472	CR	4.7 K 1/6 W
R159	QRD161J-102	CR	1 K 1/6 W
R160	QRD161J-823	CR	82 K 1/6 W
R161	QRD161J-471	CR	470 1/6 W
R162	QRD161J-152	CR	1.5 K 1/6 W
R163	QRD161J-152	CR	1.5 K 1/6 W
R164	QRD161J-392	CR	3.9 K 1/6 W
R165	QRD161J-562	CR	5.6 K 1/6 W
R166	QRD161J-102	CR	1 K 1/6 W
R167	QRD161J-562	CR	5.6 K 1/6 W
R168	QVPB613-502	VR	5 K
R169	QRD161J-103	CR	10 K 1/6 W
R170	QRD161J-392	CR	3.9 K 1/6 W
R171	QRD161J-272	CR	2.7 K 1/6 W
R172	QRD161J-682	CR	6.8 K 1/6 W
R173	QRD161J-102	CR	1 K 1/6 W
R174	QRD161J-101	CR	100 1/6 W
R175	QRD161J-101	CR	100 1/6 W
R176	QRD161J-101	CR	100 1/6 W
R177	QVPB613-501	VR	500
R178	QRD161J-101	CR	100 1/6 W
R179	QRD161J-472	CR	4.7 K 1/6 W
R180	QRD161J-101	CR	100 1/6 W
R181	QVPB613-501	VR	500
R182	QRD161J-101	CR	100 1/6 W
R183	QRD161J-472	CR	4.7 K 1/6 W
R184	QRD161J-182	CR	1.8 K 1/6 W
R185	QRD161J-562	CR	5.6 K 1/6 W
R186	QRD161J-102	CR	1 K 1/6 W
R187	QRD161J-102	CR	1 K 1/6 W
R188	QRD161J-102	CR	1 K 1/6 W
R189	QRD161J-471	CR	470 1/6 W
R190	QRD161J-392	CR	3.9 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R191	QVPB613-502	VR	5 K 1/6 W
R192	QRD161J-682	CR	6.8 K 1/6 W
R193	QRD161J-101	CR	100 1/6 W
R194	QRD161J-562	CR	5.6 K 1/6 W
R195	QRD161J-272	CR	2.7 K 1/6 W
R196	QRD161J-682	CR	6.8 K 1/6 W
R197	QRD161J-392	CR	3.9 K 1/6 W
R198	QRD161J-101	CR	100 1/6 W
R199	QRD161J-101	CR	100 1/6 W
R200	QRD161J-101	CR	100 1/6 W
R201	QVPB613-501	VR	500
R202	QRD161J-101	CR	100 1/6 W
R203	QRD161J-101	CR	100 1/6 W
R204	QRD161J-182	CR	1.8 K 1/6 W
R205	QVPB613-501	VR	500
R206	QRD161J-101	CR	100 1/6 W
R207	QRD161J-102	CR	1 K 1/6 W
R208	QRD161J-392	CR	3.9 K 1/6 W
R209	QRD161J-562	CR	5.6 K 1/6 W
R210	QVPB613-502	VR	5 K 1/6 W
R211	QRD161J-103	CR	10 K 1/6 W
R212	QRD161J-101	CR	100 1/6 W
R213	QRD161J-392	CR	3.9 K 1/6 W
R214	QRD161J-101	CR	100 1/6 W
R215	QRD161J-561	CR	560 1/6 W
R216	QRD161J-561	CR	560 1/6 W
R217	QRD161J-562	CR	5.6 K 1/6 W
R218	QRD161J-272	CR	2.7 K 1/6 W
R219	QRD161J-682	CR	6.8 K 1/6 W
R220	QRD161J-102	CR	1 K 1/6 W
R221	QRD161J-101	CR	100 1/6 W
R222	QRD161J-101	CR	100 1/6 W
R223	QRD161J-182	CR	1.8 K 1/6 W
R224	QRD161J-272	CR	2.7 K 1/6 W
R225	QRD161J-272	CR	2.7 K 1/6 W
R226	–	–	
R227	QRD161J-103	CR	10 K 1/6 W
R228	QRD161J-101	CR	100 1/6 W
R229	QRD161J-103	CR	10 K 1/6 W
R230	QRD161J-101	CR	100 1/6 W
R231	QRD161J-273	CR	27 K 1/6 W
R232	QRD161J-221	CR	220 1/6 W
R233	QRD161J-392	CR	3.9 K 1/6 W
R234	QRD161J-153	CR	15 K 1/6 W
R235	QRD161J-102	CR	1 K 1/6 W
R236	QRD161J-102	CR	1 K 1/6 W
R237	QRD161J-390	CR	39 1/6 W
R238	QRD161J-101	CR	100 1/6 W
R239	QRD161J-152	CR	1.5 K 1/6 W
R240	QRD161J-101	CR	100 1/6 W
R241	QRD161J-750	CR	75 1/6 W
R242	QRD161J-102	CR	1 K 1/6 W
R243	QRD161J-273	CR	27 K 1/6 W
R244	QRD161J-103	CR	10 K 1/6 W
R245	QRD161J-101	CR	100 1/6 W
R246	QRD161J-102	CR	1 K 1/6 W
R247	QRD161J-472	CR	4.7 K 1/6 W
R248	QRD161J-562	CR	5.6 K 1/6 W
R249	QRD161J-562	CR	5.6 K 1/6 W
R250	QRD161J-393	CR	39 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R251	QRD161J-472	CR	4.7 K 1/6 W
R252	QRD161J-472	CR	4.7 K 1/6 W
R253	QRD161J-273	CR	27 K 1/6 W
R254	QRD161J-153	CR	15 K 1/6 W
R255	QRD161J-560	CR	56 1/6 W
R256	QRD161J-682	CR	6.8 K 1/6 W
R257	QRD161J-332	CR	3.3 K 1/6 W
R258	QRD161J-562	CR	5.6 K 1/6 W
R259	QRD161J-102	CR	1 K 1/6 W
R260	QRD161J-153	CR	15 K 1/6 W
R261	QRD161J-103	CR	10 K 1/6 W
R262	QRD161J-750	CR	75 1/6 W
R263	QRD161J-272	CR	2.7 K 1/6 W
R264	QRD161J-472	CR	4.7 K 1/6 W
R265	–	–	
R266	QRD161J-103	CR	10 K 1/6 W
R267	QRD161J-101	CR	100 1/6 W
R268	QRD161J-103	CR	10 K 1/6 W
R269	QRD161J-561	CR	560 1/6 W
R270	QRD161J-331	CR	330 1/6 W
R271	QRD161J-152	CR	1.5 K 1/6 W
R272	QRD161J-472	CR	4.7 K 1/6 W
R273	QRD161J-561	CR	560 1/6 W
R274	QRD161J-822	CR	8.2 K 1/6 W
R276	QRD161J-471	CR	470 1/6 W
R277	QRD161J-471	CR	470 1/6 W
R280	QRD161J-472	CR	4.7 K 1/6 W
R281	QRD161J-471	CR	470 1/6 W
R282	QRD161J-392	CR	3.9 K 1/6 W
R283	–	–	
R284	QRD161J-562	CR	5.6 K 1/6 W
R285	QRD161J-152	CR	1.5 K 1/6 W
R286	QRD161J-152	CR	1.5 K 1/6 W
R287	QRD161J-471	CR	470 1/6 W
R288	QVPB613-502	VR	5 K
R289	QRD161J-103	CR	10 K 1/6 W
R290	QRD161J-562	CR	5.6 K 1/6 W
R291	QRD161J-392	CR	3.9 K 1/6 W
R292	QRD161J-820	CR	82 1/6 W
R293	QRD161J-101	CR	100 1/6 W
R294	QRD161J-101	CR	100 1/6 W
R295	QRD161J-272	CR	2.7 K 1/6 W
R296	QRD161J-682	CR	6.8 K 1/6 W
R297	QRD161J-102	CR	1 K 1/6 W
R298	QRD161J-101	CR	100 1/6 W
R299	QVPB613-501	VR	500
R300	QRD161J-101	CR	100 1/6 W
R301	QRD161J-101	CR	100 1/6 W
R302	QVPB613-501	VR	500
R303	QRD161J-101	CR	100 1/6 W
R305	QRD161J-182	CR	1.8 K 1/6 W
R306	QRD161J-103	CR	10 K 1/6 W
R307	QRD161J-101	CR	100 1/6 W
R308	QRD161J-332	CR	3.3 K 1/6 W
R313	QRD161J-561	CR	560 1/6 W
R314	–	–	
R315	QVPB614-501	VR	500
R316	–	–	
R317	–	–	

Symbol No.	Part No.	Part Name	Description
R318	QRD161J-472	CR	4.7 K 1/6 W
R319	QRD161J-101	CR	100 1/6 W
R320	QRD161J-472	CR	4.7 K 1/6 W
R321	QRD161J-472	CR	4.7 K 1/6 W
R323	QVPB614-501	VR	500
R325	QVPB613-501	VR	500
R326	QRD161J-101	CR	100 1/6 W
R327	QRD161J-472	CR	4.7 K 1/6 W
R328	QVPB613-501	VR	500
R329	QRD161J-101	CR	100 1/6 W
R330	QRD161J-472	CR	4.7 K 1/6 W
R331	QRD161J-223	CR	22 K 1/6 W
R332	QRD161J-273	CR	27 K 1/6 W
R333	QRD161J-473	CR	47 K 1/6 W
R334	QVPB613-503	VR	50 K
R335	QRD161J-473	CR	47 K 1/6 W
R336	QRD161J-272	CR	2.7 K 1/6 W
R337	QRD161J-222	CR	2.2 K 1/6 W
R338	QRD161J-0R0	CR	0 1/6 W
R400	QRD161J-103	CR	10 K 1/6 W
R401	QRD161J-822	CR	8.2 K 1/6 W
R402	QRD161J-820	CR	82 1/6 W
R403	QRD161J-472	CR	4.7 K 1/6 W
R404	QRD161J-473	CR	47 K 1/6 W
R405	QRD161J-823	CR	82 K 1/6 W
R406	QRD161J-823	CR	82 K 1/6 W
R407	QRD161J-473	CR	47 K 1/6 W
RA1	RKM10L103G	R Network	10 K x 10
C1	QETC1EM-107	E Cap	100 25 V
C2	QETC1EM-107	E Cap	100 25 V
C4	QFN41HJ-104	MY Cap	0.1 50 V
C5	QRD161J-0R0	CR	0 1/6 W
C6	QCS41HJ-271	C Cap	270 P 50 V
C7	QETA1CM-106	E Cap	10 16 V
C8	QETA1EM-107	E Cap	100 25 V
C9	QETA1EM-107	E Cap	100 25 V
C10	QETA1CM-106	E Cap	10 16 V
C11	QETA1CM-106	E Cap	10 16 V
C12	QETA1CM-106	E Cap	10 16 V
C13	QETA1AM-227	E Cap	220 10 V
C14	QCS11HJ-5R0	C Cap	5 P 50 V
C15	QCS11HJ-5R0	C Cap	5 P 50 V
C16	QETA1AM-107	E Cap	100 10 V
C17	QETA1EM-107	E Cap	100 25 V
C18	QETA1EM-107	E Cap	100 25 V
C20	QETA1CM-106	E Cap	10 16 V
C21	QFN41HJ-104	MY Cap	0.1 50 V
C22	QCS11HJ-271	C Cap	270 P 50 V
C23	QETA1CM-106	E Cap	10 16 V
C24	QETA1EM-107	E Cap	100 25 V
C25	QETA1CM-106	E Cap	10 16 V
C26	QETA1EM-107	E Cap	100 25 V
C27	QCS11HJ-390	C Cap	39 P 50 V

Symbol No.	Part No.	Part Name	Description
C28	QAT3001-010	TR Cap	
C29	QCS11HJ-1R0	C Cap	1 P 50 V
C30	QCS11HJ-330	C Cap	33 P 50 V
C31	QCS11HJ-1R0	C Cap	1 P 50 V
C32	QAT3001-010	TR Cap	
C33	QETA1EM-107	E Cap	100 25 V
C34	QFN41HJ-104	MY Cap	0.1 50 V
C35	QCS11HJ-271	C Cap	270 P 50 V
C36	QRD161J-0R0	CR	0 1/6 W
C37	QETA1CM-106	E Cap	10 16 V
C38	QETA1EM-107	E Cap	100 25 V
C39	QETA1EM-107	E Cap	100 25 V
C40	QRD161J-0R0	CR	0 1/6 W
C41	QFN41HJ-104	MY Cap	0.1 50 V
C42	QCS11HJ-271	C Cap	270 P 50 V
C43	QETA1CM-106	E Cap	10 16 V
C44	QETA1CM-106	E Cap	10 16 V
C45	QETA1AM-227	E Cap	220 10 V
C46	QETA1CM-106	E Cap	10 25 V
C47	QCS11HJ-5R0	C Cap	5 P 50 V
C48	QCS11HJ-5R0	C Cap	5 P 50 V
C49	QETA1CM-106	E Cap	10 16 V
C50	QETA1AM-107	E Cap	100 10 V
C51	QETA1CM-106	E Cap	10 16 V
C52	QETA1EM-107	E Cap	100 25 V
C53	QCS11HJ-820	C Cap	82 P 50 V
C54	QAT3001-010	TR Cap	
C55	QCS11HJ-1R0	C Cap	1 P 50 V
C56	QCS11HJ-330	C Cap	33 P 50 V
C57	QAT3001-010	TR Cap	
C58	QCS11HJ-1R0	C Cap	1 P 50 V
C59	QETA1EM-107	C Cap	100 25 V
C63	QETA1EM-107	E Cap	100 25 V
C64	QETA1EM-107	E Cap	100 25 V
C65	QFN41HJ-104	MY Cap	0.1 50 V
C66	QRD161J-0R0	CR	0 1/6 W
C67	QCS11HJ-271	C Cap	270 P 50 V
C68	QETA1CM-106	E Cap	10 16 V
C71	QRD161J-0R0	CR	0 1/6 W
C72	QFN41HJ-104	MY Cap	0.1 50 V
C73	QCS11HJ-271	C Cap	270 P 50 V
C74	QETA1CM-106	E Cap	10 16 V
C76	QETA1EM-107	E Cap	100 25 V
C78	QETA1EM-107	E Cap	100 25 V
C79	QCS11HJ-5R0	C Cap	5 P 50 V
C80	QCS11HJ-5R0	C Cap	5 P 50 V
C81	QETA1EM-107	E Cap	100 25 V
C82	QETA1EM-107	E Cap	100 25 V
C83	QRD161J-472	CR	4.7 K 1/6 W
C84	QCF11HP-103	E Cap	0.01 50 V
C85	QETA1EM-107	E Cap	100 25 V
C86	QFN41HJ-104	MY Cap	0.1 50 V
C87	QCS11HJ-271	C Cap	270 P 50 V
C88	QRD161J-0R0	CR	0 1/6 W
C89	QETA1CM-106	E Cap	10 16 V
C90	QETA1EM-107	E Cap	100 25 V
C91	QETA1EM-107	E Cap	100 25 V
C92	QETA1CM-106	E Cap	10 16 V

Symbol No.	Part No.	Part Name	Description
C93	QETA1EM-107	E Cap	100 25 V
C94	QFN41HJ-224	MY Cap	0.22 50 V
C95	QCS11HJ-271	C Cap	270 P 50 V
C96	QRD161J-0R0	CR	0 1/6 W
C97	QETA1CM-106	E Cap	10 16 V
C98	QCS11HJ-5R0	C Cap	5 P 50 V
C99	QETA1EM-107	E Cap	100 25 V
C101	QETA1EM-107	E Cap	100 25 V
C102	QETA1CM-106	E Cap	10 16 V
C103	QETA1AM-227	E Cap	220 10 V
C104	QETA1AM-107	E Cap	100 10 V
C105	QETA1CM-106	E Cap	10 16 V
C106	QETA1CM-106	E Cap	10 16 V
C107	QETA1EM-107	E Cap	100 25 V
C108	QETA1CM-106	E Cap	10 16 V
C109	QCS11HJ-330	C Cap	33 P 50 V
C110	QAT3001-010	TR Cap	
C111	QCS11HJ-1R0	C Cap	1 P 50 V
C112	QCS11HJ-330	C Cap	33 P 50 V
C113	QAT3001-010	TR Cap	
C114	QCS11HJ-1R0	C Cap	1 P 50 V
C115	QETA1EM-107	E Cap	100 25 V
C116	QETA1CM-106	E Cap	10 16 V
C117	QETA1AM-227	E Cap	220 10 V
C118	QETA1CM-106	E Cap	10 16 V
C119	QETA1CM-106	E Cap	10 16 V
C120	QETA1CM-106	E Cap	10 16 V
C121	QCS11HJ-1R0	C Cap	1 P 50 V
C122	QCS11HJ-470	C Cap	47 P 50 V
C123	QETA1CM-106	E Cap	10 16 V
C124	QETA1AM-227	E Cap	220 10 V
C125	QETA1CM-106	E Cap	10 16 V
C126	QETA1CM-106	E Cap	10 25 V
C127	QETA1EM-107	E Cap	100 25 V
C128	QETA1CM-106	E Cap	10 16 V
C129	QFN41HJ-224	MY Cap	0.22 50 V
C130	QRD161J-0R0	CR	0 1/6 W
C131	QCS11HJ-271	C Cap	270 P 50 V
C132	QETA1CM-106	E Cap	10 16 V
C133	QETA1EM-107	E Cap	100 25 V
C134	QCS11HJ-5R0	C Cap	5 P 50 V
C135	QETA1EM-107	E Cap	100 25 V
C136	QETA1CM-108	E Cap	1000 16 V
C137	QETA1EM-107	E Cap	100 25 V
C138	QETA1EM-107	E Cap	100 25 V
C139	QETA1CM-106	E Cap	10 16 V
C140	QFN41HJ-104	MY Cap	0.1 50 V
C141	QEN41HM-105	NP Cap	1 50 V
C142	QEN41HM-105	NP Cap	1 50 V
C143	QETA1CM-106	E Cap	10 16 V
C144	QETA1EM-107	E Cap	100 25 V
C145	QCS11HJ-220	C Cap	22 P 50 V
C146	QETA1AM-107	E Cap	100 10 V
C147	QETA1EM-107	E Cap	100 25 V
C148	QETA1EM-107	E Cap	100 25 V
C149	QFN41HJ-224	MY Cap	0.22 50 V
C150	QRD161J-0R0	CR	0 1/6 W
C151	QCS11HJ-271	C Cap	270 P 50 V
C152	QETA1CM-106	E Cap	10 16 V

6.4 CP board assembly 04

04□□□□□□

Symbol No.	Part No.	Part Name	Description	
C153	QETA1CM-106	E Cap	10	16 V
C154	QETA1EM-107	E Cap	100	25 V
C155	QETA1CM-106	E Cap	10	16 V
C156	QETA1AM-227	E Cap	220	10 V
C157	QETA1CM-106	E Cap	10	16 V
C158	QETA1CM-106	E Cap	10	16 V
C159	QETA1AM-107	E Cap	100	10 V
C160	QETC1CM-106	E Cap	10	16 V
C161	QCS11HJ-100	C Cap	10 P	50 V
C163	QETA1EM-107	E Cap	100	25 V
C164	QETA1EM-107	E Cap	100	25 V
C166	QCS11HJ-5R0	C Cap	5 P	50 V
C167	QETA1AM-227	E Cap	220	10 V
C168	QETA1EM-107	E Cap	100	25 V
C170	QAT3001-010	TR Cap		
C171	QAT3001-010	TR Cap		
C172	QCF11HP-103	C Cap	0.01	50 V
C180	QCS11HJ-330	C Cap	33 P	50 V
C181	QCS11HJ-1R0	C Cap	1 P	50 V
C182	QAT3001-010	TR Cap		
C183	QCS11HJ-330	C Cap	33 P	50 V
C184	QCS11HJ-1R0	C Cap	1 P	50 V
C185	QAT3001-010	TR Cap		
C186	QCF11HP-103	C Cap	0.01	50 V
C187	QETA1EM-107	E Cap	100	25 V
C188	QCF11HP-103	C Cap	0.01	50 V
C189	QCF11HP-103	C Cap	0.01	50 V
C190	QCF11HP-103	C Cap	0.01	50 V
C191	QCF11HP-103	C Cap	0.01	50 V
C192	QCF11HP-103	C Cap	0.01	50 V
C193	QCF11HP-103	C Cap	0.01	50 V
C200	QCS11HJ-121	C Cap	120 P	50 V
C201	QCS11HJ-100	C Cap	10 P	50 V
RA1	RKM10L103G	R Network	10 K x 10	
L1	SCV0331-8R2	Peaking Coil	8.2 µ	
L2	SCV0331-8R2	Peaking Coil	8.2 µ	
L3	SCV0331-8R2	Peaking Coil	8.2 µ	
L4	SCV0331-8R2	Peaking Coil	8.2 µ	
L5	SCV0331-8R2	Peaking Coil	8.2 µ	
L6	SCV0331-8R2	Peaking Coil	8.2 µ	
L7	SCV0331-8R2	Peaking Coil	8.2 µ	
L8	SCV0331-8R2	Peaking Coil	8.2 µ	
L9	SCV0331-8R2	Peaking Coil	8.2 µ	
L10	SCV0331-8R2	Peaking Coil	8.2 µ	
CN1	SCV1197-090	Connector	90 Pin	

Symbol No.	Part No.	Part Name	Description
IC1	TC4051BP	IC	TOSHIBA
IC2	TC4051BP	IC	TOSHIBA
IC3	TC4051BP	IC	TOSHIBA
IC4	TC4051BP	IC	TOSHIBA
IC5	MC1495L	IC	MOTOROLA
IC6	NJM4560DD	IC	JRC
IC7	TC4053BP	IC	TOSHIBA
IC8	MC1495L	IC	MOTOROLA
IC9	NJM311D	IC	JRC
IC10	NJM082P	IC	JRC
IC11	TC4099BP	IC	TOSHIBA
IC12	AN90B22	IC	MATSUSHITA
IC13	TC4099BP	IC	TOSHIBA
IC14	TC74HC373P	IC	TOSHIBA
IC15	TC4099BP	IC	TOSHIBA
IC16	TC74HC373P	IC	TOSHIBA
IC17	TC74HC85AP	IC	TOSHIBA
IC18	TC74HC373P	IC	TOSHIBA
IC19	TC74HC85AP	IC	TOSHIBA
IC20	TA7347P	IC	TOSHIBA
IC21	TA7347P	IC	TOSHIBA
IC22	TA7348P	IC	TOSHIBA
IC23	TA7347P	IC	TOSHIBA
IC24	TC4069UBP	IC	TOSHIBA
IC25	TC4051BP	IC	TOSHIBA
IC26	TC4051BP	IC	TOSHIBA
IC27	TC4051BP	IC	TOSHIBA
IC28	TC4051BP	IC	TOSHIBA
IC29	TC4051BP	IC	TOSHIBA
IC30	TC4051BP	IC	TOSHIBA
IC31	TC4051BP	IC	TOSHIBA
IC32	TC4051BP	IC	TOSHIBA
IC33	TC4012BP	IC	TOSHIBA
IC34	TC4069UBP	IC	TOSHIBA
IC35	TC4073BP	IC	TOSHIBA
Q1	2SC1685(R)	Transistor	MATSUSHITA
Q2	2SC1685(R)	Transistor	MATSUSHITA
Q3	2SC1685(R)	Transistor	MATSUSHITA
Q4	2SC1685(R)	Transistor	MATSUSHITA
Q5	2SC1685(R)	Transistor	MATSUSHITA
Q6	2SC1685(R)	Transistor	MATSUSHITA
Q7	2SC1685(R)	Transistor	MATSUSHITA
Q8	2SC1685(R)	Transistor	MATSUSHITA
Q9	2SC1685(R)	Transistor	MATSUSHITA
Q10	2SC1685(R)	Transistor	MATSUSHITA
Q11	2SC1685(R)	Transistor	MATSUSHITA
Q12	2SC1685(R)	Transistor	MATSUSHITA
Q13	2SC1685(R)	Transistor	MATSUSHITA
Q14	2SC1685(R)	Transistor	MATSUSHITA
Q15	2SC1685(R)	Transistor	MATSUSHITA
Q16	2SC1685(R)	Transistor	MATSUSHITA
Q17	2SC1685(R)	Transistor	MATSUSHITA
Q18	2SA564(R)	Transistor	MATSUSHITA
Q19	2SC1685(R)	Transistor	MATSUSHITA
Q20	2SC1685(R)	Transistor	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
Q21	2SC1685(R)	Transistor	MATSUSHITA
Q22	2SK163(M.N)	FET	NEC
Q23	2SC1685(R)	Transistor	MATSUSHITA
Q24	2SC1685(R)	Transistor	MATSUSHITA
Q25	2SA564(R)	Transistor	MATSUSHITA
Q26	2SA564(R)	Transistor	MATSUSHITA
Q31	2SC1685(R)	Transistor	MATSUSHITA
Q32	2SC1685(R)	Transistor	MATSUSHITA
Q33	2SC1685(R)	Transistor	MATSUSHITA
Q34	2SC1685(R)	Transistor	MATSUSHITA
Q35	2SC1685(R)	Transistor	MATSUSHITA
Q36	2SC1685(R)	Transistor	MATSUSHITA
Q37	2SC1685(R)	Transistor	MATSUSHITA
Q38	2SC1685(R)	Transistor	MATSUSHITA
Q39	2SC1685(R)	Transistor	MATSUSHITA
Q40	2SC1509(R)	Transistor	MATSUSHITA
Q41	2SC1509(R)	Transistor	MATSUSHITA
Q42	2SK163(M.N)	FET	NEC
Q43	2SK163(M.N)	FET	NEC
Q44	2SK163(M.N)	FET	NEC
Q45	2SK163(M.N)	FET	NEC
Q46	2SK163(M.N)	FET	NEC
Q47	2SK163(M.N)	FET	NEC
Q48	2SK163(M.N)	FET	NEC
Q49	2SK163(M.N)	FET	NEC
Q50	2SK163(M.N)	FET	NEC
Q51	2SC1685(R)	Transistor	MATSUSHITA
Q52	2SA564(R)	Transistor	MATSUSHITA
Q53	2SC1685(R)	Transistor	MATSUSHITA
Q54	2SC1685(R)	Transistor	MATSUSHITA
Q55	2SC1685(R)	Transistor	MATSUSHITA
Q56	2SC1685(R)	Transistor	MATSUSHITA
Q57	2SC1685(R)	Transistor	MATSUSHITA
Q60	2SC1685(R)	Transistor	MATSUSHITA
D1	HZ3C2	Zener Diode	HITACHI
D2	HZ12A1L	Zener Diode	HITACHI
D3	HZ3C2	Zener Diode	HITACHI
D4	HZ12A1L	Zener Diode	HITACHI
D5	SVC321(A)	V.C. Diode	SANYO
D6	SVC321(A)	V.C. Diode	SANYO
D7	SVC321(A)	V.C. Diode	SANYO
D8	SVC321(A)	V.C. Diode	SANYO
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	HZ15-2L	Zener Diode	HITACHI
R1	QRD161J-153	CR	15 K 1/6 W
R2	QRD161J-103	CR	10 K 1/6 W
R3	QRD161J-272	CR	2.7 K 1/6 W
R4	QRD161J-153	CR	15 K 1/6 W
R5	QRD161J-103	CR	10 K 1/6 W
R6	QRD161J-272	CR	2.7 K 1/6 W
R7	QRD161J-153	CR	15 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R8	QRD161J-103	CR	10 K 1/6 W
R9	QRD161J-472	CR	4.7 K 1/6 W
R10	QRD161J-272	CR	2.7 K 1/6 W
R11	QRD161J-151	CR	150 1/6 W
R12	QRD161J-331	CR	330 1/6 W
R13	QRD161J-151	CR	150 1/6 W
R14	QRD161J-151	CR	150 1/6 W
R15	QRD161J-331	CR	330 1/6 W
R16	QRD161J-151	CR	150 1/6 W
R17	QRD161J-151	CR	150 1/6 W
R18	QRD161J-331	CR	330 1/6 W
R19	QRD161J-151	CR	150 1/6 W
R20	QRD161J-473	CR	47 K 1/6 W
R21	QRD161J-473	CR	47 K 1/6 W
R22	QRD161J-473	CR	47 K 1/6 W
R23	QRD161J-272	CR	2.7 K 1/6 W
R24	QRD161J-333	CR	33 K 1/6 W
R25	QRD161J-153	CR	15 K 1/6 W
R26	QRD161J-272	CR	2.7 K 1/6 W
R27	QRD161J-333	CR	33 K 1/6 W
R28	QRD161J-153	CR	15 K 1/6 W
R29	QRD161J-561	CR	560 1/6 W
R30	QRD161J-561	CR	560 1/6 W
R31	QRD161J-682	CR	6.8 K 1/6 W
R32	QRD161J-562	CR	5.6 K 1/6 W
R33	QRD161J-562	CR	5.6 K 1/6 W
R34	QRD161J-152	CR	1.5 K 1/6 W
R35	QRD161J-152	CR	1.5 K 1/6 W
R36	QRD161J-101	CR	100 1/6 W
R37	QRD161J-682	CR	6.8 K 1/6 W
R38	QRD161J-561	CR	560 1/6 W
R39	QRD161J-472	CR	4.7 K 1/6 W
R40	QRD161J-332	CR	3.3 K 1/6 W
R41	QRD161J-561	CR	560 1/6 W
R42	QRD161J-101	CR	100 1/6 W
R43	QRD161J-182	CR	1.8 K 1/6 W
R44	QRD161J-682	CR	6.8 K 1/6 W
R45	QRD161J-102	CR	1 K 1/6 W
R46	QRD161J-271	CR	270 1/6 W
R47	QVPB613-501	VR	500
R48	QRD161J-271	CR	270 1/6 W
R49	QRD161J-182	CR	1.8 K 1/6 W
R50	QVPB613-501	VR	500
R51	QRD161J-561	CR	560 1/6 W
R52	QRD161J-182	CR	1.8 K 1/6 W
R53	QVPB614-202	VR	2 K
R54	QRD161J-472	CR	4.7 K 1/6 W
R55	QRD161J-473	CR	47 K 1/6 W
R56	QRD161J-103	CR	10 K 1/6 W
R57	QRD161J-102	CR	1 K 1/6 W
R58	QRD161J-472	CR	4.7 K 1/6 W
R59	QRD161J-472	CR	4.7 K 1/6 W
R60	QRD161J-102	CR	1 K 1/6 W
R61	QVPB614-202	VR	2 K
R62	QRD161J-272	CR	2.7 K 1/6 W
R63	QRD161J-103	CR	10 K 1/6 W
R64	QRD161J-332	CR	3.3 K 1/6 W
R65	QRD161J-272	CR	2.7 K 1/6 W
R66	QRD161J-333	CR	33 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R67	QRD161J-153	CR	15 K 1/6 W
R68	QRD161J-272	CR	2.7 K 1/6 W
R69	QRD161J-333	CR	33 K 1/6 W
R70	QRD161J-153	CR	15 K 1/6 W
R71	QRD161J-561	CR	560 1/6 W
R72	QRD161J-561	CR	560 1/6 W
R73	QRD161J-682	CR	6.8 K 1/6 W
R74	QRD161J-562	CR	5.6 K 1/6 W
R75	QRD161J-562	CR	5.6 K 1/6 W
R76	QRD161J-152	CR	1.5 K 1/6 W
R77	QRD161J-152	CR	1.5 K 1/6 W
R78	QRD161J-101	CR	100 1/6 W
R79	QRD161J-682	CR	6.8 K 1/6 W
R80	QRD161J-561	CR	560 1/6 W
R81	QRD161J-472	CR	4.7 K 1/6 W
R82	QRD161J-332	CR	3.3 K 1/6 W
R83	QRD161J-561	CR	560 1/6 W
R84	QRD161J-101	CR	100 1/6 W
R85	QRD161J-182	CR	1.8 K 1/6 W
R86	QRD161J-682	CR	6.8 K 1/6 W
R87	QRD161J-102	CR	1 K 1/6 W
R88	QRD161J-271	CR	270 1/6 W
R89	QVPB613-501	VR	500
R90	QRD161J-271	CR	270 1/6 W
R91	QRD161J-182	CR	1.8 K 1/6 W
R92	QRD161J-821	CR	820 1/6 W
R93	QRD161J-222	CR	2.2 K 1/6 W
R94	QRD161J-222	CR	2.2 K 1/6 W
R95	QRD161J-393	CR	39 K 1/6 W
R96	QRD161J-103	CR	10 K 1/6 W
R97	QRD161J-821	CR	820 1/6 W
R98	QRD161J-471	CR	470 1/6 W
R99	QRD161J-122	CR	1.2 K 1/6 W
R100	QRD161J-683	CR	68 K 1/6 W
R101	QRD161J-333	CR	33 K 1/6 W
R102	QRD161J-471	CR	470 1/6 W
R103	QRD161J-104	CR	100 K 1/6 W
R104	QRD161J-103	CR	10 K 1/6 W
R105	QVPB614-103	VR	10 K
R106	QRD161J-681	CR	680 1/6 W
R107	QRD161J-392	CR	3.9 K 1/6 W
R108	QRD161J-103	CR	10 K 1/6 W
R109	QRD161J-222	CR	2.2 K 1/6 W
R110	QRD161J-122	CR	1.2 K 1/6 W
R111	QRD161J-223	CR	22 K 1/6 W
R112	QRD161J-333	CR	33 K 1/6 W
R113	QRD161J-823	CR	82 K 1/6 W
R114	QRD161J-823	CR	82 K 1/6 W
R115	QRD161J-102	CR	1 K 1/6 W
R116	QRD161J-272	CR	2.7 K 1/6 W
R117	QRD161J-223	CR	22 K 1/6 W
R118	QRD161J-562	CR	5.6 K 1/6 W
R119	QRD161J-102	CR	1 K 1/6 W
R120	QRD161J-562	CR	5.6 K 1/6 W
R121	QRD161J-152	CR	1.5 K 1/6 W
R122	QRD161J-681	CR	680 1/6 W
R123	QRD161J-821	CR	820 /6 W
R124	QRD161J-472	CR	4.7 K 1/6 W
R125	QRD161J-472	CR	4.7 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R129	QRD161J-473	CR	47 K 1/6 W
R130	QRD161J-473	CR	47 K 1/6 W
R131	QRD161J-473	CR	47 K 1/6 W
R132	QRD161J-473	CR	47 K 1/6 W
R141	QVPB614-501	VR	500
R142	QVPB614-501	VR	500
R143	QVPB614-501	VR	500
R144	QRD161J-471	CR	470 1/6 W
R145	QRD161J-471	CR	470 1/6 W
R146	QRD161J-471	CR.	470 1/6 W
R147	QRD161J-471	CR	470 1/6 W
R148	QRD161J-330	CR	33 1/6 W
R149	QRD161J-330	CR	33 1/6 W
R150	QRD161J-332	CR	3.3 K 1/6 W
R151	QRD161J-102	CR	1 K 1/6 W
R152	QRD161J-272	CR	2.7 K 1/6 W
R153	QRD161J-221	CR	220 1/6 W
R154	QRD161J-272	CR	2.7 K 1/6 W
R155	QVPB614-202	VR	2 K
R156	QRD161J-181	CR	180 1/6 W
R157	QRD161J-152	CR	1.5 K 1/6 W
R158	QRV141F-75R0AY	MFR	75 1/4 W
R159	QRD161J-221	CR	220 1/6 W
R160	QRD161J-272	CR	2.7 K 1/6 W
R161	QVPB614-202	VR	2 K
R162	QRD161J-181	CR	180 1/6 W
R163	QRD161J-152	CR	1.5 K 1/6 W
R164	QRV141F-75R0AY	MFR	75 1/4 W
R165	QRD161J-332	CR	3.3 K 1/6 W
R166	QRD161J-102	CR	1 K 1/6 W
R167	QRD161J-272	CR	2.7 K 1/6 W
R168	QRD161J-331	CR	330 1/6 W
R169	QRD161J-153	CR	15 K 1/6 W
R170	QVPB613-501	VR	500
R171	QRD161J-472	CR	4.7 K 1/6 W
R172	QRD161J-122	CR	1.2 K 1/6 W
R173	QRD161J-121	CR	120 K 1/6 W
R174	QVPB613-201	VR	200
R175	QRD161J-272	CR	2.7 K 1/6 W
R176	QRD161J-103	CR	10 K 1/6 W
R177	QRD161J-560	CR	56 1/6 W
R178	QRD161J-472	CR	4.7 K 1/6 W
R179	QRD161J-272	CR	2.7 K 1/6 W
R180	QRD161J-152	CR	1.5 K 1/6 W
R181	QRD161J-471	CR	470 1/6 W
R182	QRD161J-182	CR	1.8 K 1/6 W
R183	QRD161J-101	CR	100 1/6 W
R184	QRD161J-101	CR	100 1/6 W
R185	QRD161J-270	CR	27 1/6 W
R186	QRD161J-472	CR	4.7 K 1/6 W
R187	QRD161J-152	CR	1.5 K 1/6 W
R188	QRD161J-270	CR	27 1/6 W
R189	QRD161J-103	CR	10 K 1/6 W
R190	QRD161J-473	CR	47 K 1/6 W
R191	QRD161J-473	CR	47 K 1/6 W
R192	QRD161J-221	CR	220 1/6 W
R193	QRD161J-223	CR	22 K 1/6 W
R194	–	–	

Symbol No.	Part No.	Part Name	Description
R195	QRD161J-221	CR	220 1/6 W
R196	QRD161J-223	CR	22 K 1/6 W
R197	–	–	
R198	QRD161J-221	CR	220 1/6 W
R199	QRD161J-223	CR	22 K 1/6 W
R200	–	–	
R201	QRD161J-221	CR	220 1/6 W
R202	QRD161J-223	CR	22 K 1/6 W
R203	–	–	
R204	QRD161J-221	CR	220 1/6 W
R205	QRD161J-223	CR	22 K 1/6 W
R206	–	–	
R207	QRD161J-221	CR	220 1/6 W
R208	QRD161J-223	CR	22 K 1/6 W
R209	–	–	
R210	QRD161J-221	CR	220 1/6 W
R211	QRD161J-223	CR	22 K 1/6 W
R212	–	–	
R213	QRD161J-221	CR	220 1/6 W
R214	QRD161J-223	CR	22 K 1/6 W
R215	–	–	
R216	QRD161J-221	CR	220 1/6 W
R217	QRD161J-223	CR	22 K 1/6 W
R218	–	–	
R219	QRD161J-332	CR	3.3 K 1/6 W
R220	QRD161J-272	CR	2.7 K 1/6 W
R221	QRD161J-473	CR	47 K 1/6 W
R222	QRD161J-473	CR	47 K 1/6 W
R223	QRD161J-221	CR	220 1/6 W
R224	QRD161J-473	CR	47 K 1/6 W
R225	QRD161J-221	CR	220 1/6 W
R226	QRD161J-473	CR	47 K 1/6 W
R227	QRD161J-152	CR	1.5 K 1/6 W
R228	QRD161J-681	CR	680 1/6 W
R229	QRD161J-681	CR	680 1/6 W
R230	QRD161J-473	CR	4.7 K 1/6 W
R231	QRD161J-221	CR	220 1/6 W
R232	QRD161J-473	CR	47 K 1/6 W
R233	QRD161J-152	CR	1.5 K 1/6 W
R234	QRD161J-331	CR	330 1/6 W
R235	QRD161J-473	CR	47 K 1/6 W
R236	QRD161J-221	CR	220 1/6 W
R237	QRD161J-473	CR	47 K 1/6 W
R238	QRD161J-152	CR	1.5 K 1/6 W
R239	QRD161J-331	CR	330 1/6 W
R240	QRD161J-473	CR	47 K 1/6 W
R241	QRD161J-221	CR	220 1/6 W
R242	QRD161J-473	CR	47 K 1/6 W
R243	QRD161J-152	CR	1.5 K 1/6 W
R244	QRD161J-331	CR	330 1/6 W
R245	QVPB613-102	VR	1 K
R246	QVPB613-102	VR	1 K
R247	QRD161J-222	CR	2.2 K 1/6 W
R251	QVPB613-102	VR	1 K
R252	QRD161J-471	CR	470 1/6 W
R253	QRD161J-471	CR	470 1/6 W
R254	QRD161J-471	CR	470 1/6 W
R255	QRV141F-75R0AY	MFR	75 1/4 W
R256	QRV141F-75R0AY	MFR	75 1/4 W

Symbol No.	Part No.	Part Name	Description
R257	QRD161J-271	CR	270 1/6 W
R258	QRD161J-223	CR	22 K 1/6 W
R259	QRD161J-392	CR	3.9 K 1/6 W
R260	QRD161J-822	CR	8.2 K 1/6 W
R261	QRD161J-272	CR	2.7 K 1/6 W
R262	QRD161J-273	CR	27 K 1/6 W
R263	QRD161J-393	CR	39 K 1/6 W
R264	QRD161J-222	CR	2.2 K 1/6 W
R265	QRD161J-223	CR	22 K 1/6 W
R266	–	–	
R267	QRD161J-223	CR	22 K 1/6 W
R268	QRD161J-223	CR	22 K 1/6 W
R300	QRD161J-472	CR	4.7 K 1/6 W
R301	QRD161J-682	CR	6.8 K 1/6 W
R302	QRD161J-562	CR	5.6 K 1/6 W
R303	QRD161J-221	CR	220 1/6 W
R306	QRD161J-681	CR	680 1/6 W
R307	QRD161J-564	CR	560 K 1/6 W
R308	QRD161J-564	CR	560 K 1/6 W
R309	QRD161J-564	CR	560 K 1/6 W
R310	QRD161J-564	CR	560 K 1/6 W
R311	QRD161J-564	CR	560 K 1/6 W
R312	QRD161J-564	CR	560 K 1/6 W
R313	QRD161J-564	CR	560 K 1/6 W
R314	QRD161J-564	CR	560 K 1/6 W
R315	QRD161J-564	CR	560 K 1/6 W
R316	QRD161J-560	CR	56 1/6 W
R317	QRD161J-560	CR	56 1/6 W
R318	QRD161J-221	CR	220 1/6 W
R319	QRD161J-221	CR	220 1/6 W
R320	QRD161J-221	CR	220 1/6 W
R321	QRD161J-221	CR	220 1/6 W
C1	QETA1EM-476	E Cap	47 25 V
C2	QETA1EM-476	E Cap	47 25 V
C3	QETA1EM-476	E Cap	47 25 V
C4	QETA1EM-476	E Cap	47 25 V
C5	QETA1CM-476	E Cap	47 16 V
C6	QETA1CM-476	E Cap	47 16 V
C7	QETA1CM-476	E Cap	47 16 V
C8	QETA1EM-106	E Cap	10 25 V
C9	QETA1EM-106	E Cap	10 25 V
C10	QETA1EM-106	E Cap	10 25 V
C11	QETA1EM-106	E Cap	10 25 V
C12	QETA1EM-106	E Cap	10 25 V
C13	QETA1EM-106	E Cap	10 25 V
C14	QETA1EM-106	E Cap	10 25 V
C15	QETA1EM-106	E Cap	10 25 V
C16	QETA1EM-476	E Cap	47 25 V
C17	QETA1EM-476	E Cap	47 25 V
C18	QETA1EM-476	E Cap	47 25 V
C19	QCF11HP-103	C Cap	0.01 50 V
C20	QETA1EM-106	E Cap	10 25 V
C21	QETA1EM-476	E Cap	47 25 V
C22	QCF11HP-103	C Cap	0.01 50 V
C23	QETA1EM-476	E Cap	47 25 V

Symbol No.	Part No.	Part Name	Description	
C24	QETA1CM-476	E Cap	47	16 V
C25	QETA1CM-476	E Cap	47	16 V
C26	QETA1CM-476	E Cap	47	16 V
C27	QETA1EM-106	E Cap	10	25 V
C28	QETA1EM-106	E Cap	10	25 V
C29	QETA1EM-106	E Cap	10	25 V
C30	QETA1EM-106	E Cap	10	25 V
C31	QETA1EM-106	E Cap	10	25 V
C32	QETA1EM-106	E Cap	10	25 V
C33	QETA1EM-106	E Cap	10	25 V
C34	QETA1EM-106	E Cap	10	25 V
C35	QETA1EM-476	E Cap	47	25 V
C36	QETA1EM-476	E Cap	47	25 V
C37	QETA1EM-476	E Cap	47	25 V
C38	QETA1EM-476	E Cap	47	25 V
C39	QCS11HJ-470	C Cap	47 P	50 V
C40	QETA1CM-476	E Cap	47	16 V
C41	QCS11HJ-101	C Cap	100 P	50 V
C42	QCS11HJ-101	C Cap	100 P	50 V
C43	QCS11HJ-101	C Cap	100 P	50 V
C44	QCZ0206-104	C Cap	0.1	
C45	QETA1CM-476	E Cap	47	16 V
C46	QETA1EM-476	E Cap	47	25 V
C47	QFN41HJ-333	MY Cap	0.033	50 V
C48	QETA1CM-476	E Cap	47	16 V
C49	QETA1EM-476	E Cap	47	25 V
C50	QETA1EM-476	E Cap	47	25 V
C52	QETA1EM-476	E Cap	47	25 V
C53	QETA1EM-476	E Cap	47	25 V
C54	QCF11HP-103	C Cap	0.01	50 V
C55	QCF11HP-103	C Cap	0.01	50 V
C56	QCF11HP-103	C Cap	0.01	50 V
C57	QCF11HP-103	C Cap	0.01	50 V
C58	QCF11HP-103	C Cap	0.01	50 V
C59	QCF11HP-103	C Cap	0.01	50 V
C60	QCF11HP-103	C Cap	0.01	50 V
C61	QCF11HP-103	C Cap	0.01	50 V
C62	QCF11HP-103	C Cap	0.01	50 V
C70	QETA1EM-476	E Cap	47	25 V
C71	QETA1EM-476	E Cap	47	25 V
C72	QETA1EM-476	E Cap	47	25 V
C73	QETA1EM-476	E Cap	47	25 V
C74	QETA1EM-476	E Cap	47	25 V
C75	QETA1EM-476	E Cap	47	25 V
C76	QETA1EM-476	E Cap	47	25 V
C77	QETA1EM-476	E Cap	47	25 V
C78	QCS11HJ-5R0	C Cap	5 P	50 V
C79	QCS11HJ-100	C Cap	10 P	50 V
C80	QCS11HJ-100	C Cap	10 P	50 V
C81	QCS11HJ-100	C Cap	10 P	50 V
C82	QCS11HJ-100	C Cap	10 P	50 V
C83	QCS11HJ-100	C Cap	10 P	50 V
C84	–	–		
C85	QCS11HJ-5R0	C Cap	5 P	50 V
C86	QETA1EM-476	E Cap	47	25 V
C87	QCS11HJ-5R0	C Cap	5 P	50 V
C88	QCS11HJ-100	C Cap	10 P	50 V
C89	QCS11HJ-100	C Cap	10 P	50 V
C90	QCS11HJ-100	C Cap	10 P	50 V

Symbol No.	Part No.	Part Name	Description	
C91	QCS11HJ-100	C Cap	10 P	50 V
C92	QCS11HJ-100	C Cap	10 P	50 V
C93	–	–		
C94	QCS11HJ-5R0	C Cap	5 P	50 V
C95	QETA1EM-106	E Cap	10	25 V
C96	QETA1EM-476	E Cap	47	25 V
C97	QETA1EM-476	E Cap	47	25 V
C98	QETA1EM-476	E Cap	47	25 V
C99	QETA1EM-476	E Cap	47	25 V
C100	QETA1EM-106	E Cap	10	25 V
C101	QETA1EM-106	E Cap	10	25 V
C102	QCF11HP-103	C Cap	0.01	50V
C103	QCZ0206-104	C Cap	0.1	
C104	QETA1EM-476	E Cap	47	25 V
C105	QETA1EM-476	E Cap	47	25 V
C106	QCF11HP-103	C Cap	0.01	50V
C107	QCZ0206-104	C Cap	0.1	
C108	QCS11HJ-680	C Cap	68 P	50 V
C109	QCS11HJ-150	C Cap	15 P	50 V
C110	QCS11HJ-330	C Cap	33 P	50 V
C111	QCS11HJ-7R0	C Cap	7 P	50 V
C112	QETA1EM-476	E Cap	47	25 V
C113	QETA1EM-476	E Cap	47	25 V
C114	QCF11HP-103	C Cap	0.01	50 V
C115	QCF11HP-103	C Cap	0.01	50 V
C116	QETA1EM-476	E Cap	47	25 V
C117	QETA1EM-476	E Cap	47	25 V
C118	QETA1EM-476	E Cap	47	25 V
C119	QCF11HP-103	C Cap	0.01	50 V
C120	QCZ0206-104	C Cap	0.1	
C121	QETA1EM-476	E Cap	47	25 V
C122	QCS11HJ-100	C Cap	10 P	50 V
C123	QETA1EM-107	E Cap	100	25 V
C124	QETA1EM-107	E Cap	100	25 V
C125	QETA1EM-476	E Cap	47	25 V
C126	QCS11HJ-100	C Cap	10 P	50 V
C127	QAT3001-010	TT Cap		
C128	QCS11HJ-5R0	C Cap	5 P	50 V
C129	QETA1EM-107	E Cap	100	25 V
C130	QCF11HP-103	C Cap	0.01	50 V
C131	QETA1EM-476	E Cap	47	25 V
C132	QETA1EM-476	E Cap	47	25 V
C133	QETA1EM-476	E Cap	47	25 V
C134	QETA1EM-476	E Cap	47	25 V
C135	QETA1EM-476	E Cap	47	25 V
C136	QETA1EM-476	E Cap	47	25 V
C137	QETA1EM-476	E Cap	47	25 V
C138	QETA1EM-476	E Cap	47	25 V
C139	QETA1CM-476	E Cap	47	16 V
C140	QEPA1HM-105	NP Cap	1	50 V
C141	QCS11HJ-150	C Cap	15 P	50 V
C142	QETA1CM-476	E Cap	47	16 V
C143	QEPA1HM-105	NP Cap	1	50 V
C144	QCS11HJ-150	C Cap	15 P	50 V
C145	QETA1CM-476	E Cap	47	16 V
C146	QEPA1HM-105	NP Cap	1	50 V
C147	QCS11HJ-150	C Cap	15 P	50 V
C148	QETA1CM-476	E Cap	47	16 V
C149	QEPA1HM-105	NP Cap	1	50 V
C150	QCS11HJ-150	C Cap	15 P	50 V

Symbol No.	Part No.	Part Name	Description
C151	QETA1CM-476	E Cap	47 16 V
C152	QEPA1HM-105	NP Cap	1 50 V
C153	QCS11HJ-150	C Cap	15 P 50 V
C154	QETA1CM-476	E Cap	47 16 V
C155	QEPA1HM-105	NP Cap	1 50 V
C156	QCS11HJ-150	C Cap	15 P 50 V
C157	QETA1CM-476	E Cap	47 16 V
C158	QEPA1HM-105	NP Cap	1 50 V
C159	QCS11HJ-150	C Cap	15 P 50 V
C160	QETA1CM-476	E Cap	47 16 V
C161	QEPA1HM-105	NP Cap	1 50 V
C162	QCS11HJ-150	C Cap	15 P 50 V
C163	QETA1CM-476	E Cap	47 16 V
C164	QEPA1HM-105	E Cap	1 50 V
C165	QCS11HJ-150	C Cap	15 P 50 V
C166	QETA1CM-476	E Cap	47 16 V
C167	QETA1CM-476	E Cap	47 16 V
C168	QETA1EM-476	E Cap	47 25 V
C169	QETA1CM-476	E Cap	47 16 V
C170	QETA1EM-106	E Cap	10 25 V
C171	QETA1CM-476	E Cap	47 16 V
C172	QETA1EM-476	E Cap	47 25 V
C173	QETA1CM-476	E Cap	47 16 V
C174	QETA1EM-106	E Cap	10 25 V
C175	QETA1EM-476	E Cap	47 25 V
C176	QCF11HP-103	C Cap	0.01 50 V
C177	QCF11HP-103	C Cap	0.01 50 V
C178	QCF11HP-103	C Cap	0.01 50 V
C179	QCF11HP-103	C Cap	0.01 50 V
C180	QCF11HP-103	C Cap	0.01 50 V
C181	QCF11HP-103	C Cap	0.01 50 V
C182	QCF11HP-103	C Cap	0.01 50 V
C183	QCF11HP-103	C Cap	0.01 50 V
C184	QCF11HP-103	C Cap	0.01 50 V
C185	QETA1EM-476	E Cap	47 25 V
C186	QCF11HP-103	C Cap	0.01 50 V
C187	QCF11HP-103	C Cap	0.01 50 V
C188	QCF11HP-103	C Cap	0.01 50 V
C189	QCF11HP-103	C Cap	0.01 50 V
C190	QETA1EM-476	E Cap	47 25 V
C191	–	–	
C201	QCS11HJ-5R0	C Cap	5 P 50 V
C202	QCS11HJ-100	C Cap	10 P 50 V
C203	QCS11HJ-100	C Cap	10 P 50 V
C204	QETA1EM-476	E Cap	47 25 V
C300	QETA1EM-476	E Cap	47 25 V
L1	SCV0331-220	Peaking Coil	22 µ
L2	SCV0331-220	Peaking Coil	22 µ
L3	SCV0331-220	Peaking Coil	22 µ
L4	SCV0331-220	Peaking Coil	22 µ
L5	SCV0331-120	Peaking Coil	12 µ
L6	SCV0331-120	Peaking Coil	12 µ
L7	SCV0331-120	Peaking Coil	12 µ
L8	SCV0331-120	Peaking Coil	12 µ
L9	QRD161J-0R0	CR	0 1/6 W
L10	SCV0331-220	Peaking Coil	22 µ

Symbol No.	Part No.	Part Name	Description
L11	SCV0331-2R2	Peaking Coil	2.2 µ
L12	SCV0331-2R2	Peaking Coil	2.2 µ
L13	SCV0331-2R2	Peaking Coil	2.2 µ
L14	SCV0331-2R2	Peaking Coil	2.2 µ
L15	SCV0331-2R2	Peaking Coil	2.2 µ
L16	SCV0331-2R2	Peaking Coil	2.2 µ
L17	QRD161J-0R0	CR	0 1/6 W
L18	SCV0331-2R2	Peaking Coil	2.2 µ
L19	SCV0331-2R2	Peaking Coil	2.2 µ
L20	SCV0331-2R2	Peaking Coil	2.2 µ
L21	SCV0331-2R2	Peaking Coil	2.2 µ
L22	SCV0331-2R2	Peaking Coil	2.2 µ
L23	SCV0331-2R2	Peaking Coil	2.2 µ
L24	QRD161J-0R0	CR	0 1/6 W
L25	SCV0331-820	Peaking Coil	82 µ
L26	SCV0331-820	Peaking Coil	82 µ
L27	SCV0331-820	Peaking Coil	82 µ
L28	SCV0331-820	Peaking Coil	82 µ
L29	SCV0331-820	Peaking Coil	82 µ
L30	SCV0331-820	Peaking Coil	82 µ
L31	SCV0331-820	Peaking Coil	82 µ
L32	SCV0331-820	Peaking Coil	82 µ
L33	SCV0331-820	Peaking Coil	82 µ
J1	SCV1147-001	Connector	
	SCV1149-001	Short pin	
J2	SCV1147-001	Connector	
	SCV1149-001	Short pin	
CN2	SCV1197-090	Connector	90 Pin
CN6	SCV1197-032	Connector	30 Pin
CBM1 – CBM4	**CBMC4373-00A**	**BUFFER CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	–	–	
Q3	–	–	
Q4	2SC2814(F4.5)	Transistor	SANYO
Q5	2SC2814(F4.5)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCB21HK-103	C Cap	0.01 50 V
C4	–	–	
C5	NCS21HJ-330	C Cap	33 P 50 V
C6	NCT03CH-8R0	C Cap	8 P 50 V

Symbol No.	Part No.	Part Name	Description
CBM5 – CBM7	**CBMC4355-00A**	**VIDEO CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SC2814(F4.5)	Transistor	SANYO
C1	NCF21HZ-473	C Cap	0.047 50 V
C2	NCF21HZ-473	C Cap	0.047 50 V
	●CK board assembly (Not available on the -002 CP board and after.)		
IC1	TC4051BF	IC	TOSHIBA
IC2	TC4051BF	IC	TOSHIBA
IC3	TC4051BF	IC	TOSHIBA
IC4	TC4051BF	IC	TOSHIBA
Q57	2SA1256(E4.5)	Transistor	SANYO
R247	NRSA02J-222	MGR	2.2 K 1/10 W
C186	NCF21HZ-103	C Cap	0.01 50 V
C187	NCF21HZ-103	C Cap	0.01 50 V
C188	NCF21HZ-103	C Cap	0.01 50 V
C189	NCF21HZ-103	C Cap	0.01 50 V

6.5 WF board assembly 05

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Symbol No.	Part No.	Part Name	Description
IC1	NJM319D	IC	JRC
IC2	UPD74HC86C	IC	NEC
IC3	UPD74HC10C	IC	NEC
IC4	TC4053BP	IC	TOSHIBA
IC5	NJM319D	IC	JRC
IC6	NJM082D	IC	JRC
IC7	–	–	
IC8	AN90B22	IC	MATSUSHITA
IC9	AN90B22	IC	MATSUSHITA
IC10	AN90B22	IC	MATSUSHITA
IC11	AN90B22	IC	MATSUSHITA
IC12	TC4099BP	IC	TOSHIBA
IC13	TC4099BP	IC	TOSHIBA
IC14	TC4069UBP	IC	TOSHIBA
IC15	TC4011BP	IC	TOSHIBA
IC16	TC4053BP	IC	TOSHIBA
IC17	NJM082D	IC	JRC
IC18	NJM082D	IC	JRC
IC19	TC4053BP	IC	TOSHIBA
IC20	TC4013BAP	IC	TOSHIBA
IC21	NJM082D	IC	JRC
IC22	AN6914	IC	MATSUSHITA
IC23	TC4053BP	IC	TOSHIBA
IC24	NJM082D	IC	JRC
IC25	BA6110	IC	ROHM
IC26	NJM082D	IC	JRC
IC27	TC4053BP	IC	TOSHIBA
IC28	NJM082D	IC	JRC
IC29	NJM082D	IC	JRC
IC30	BA6110	IC	ROHM
IC31	TC4051BP	IC	TOSHIBA
IC32	TC4051BP	IC	TOSHIBA
IC33	TC4051BP	IC	TOSHIBA
IC34	TC4051BP	IC	TOSHIBA
IC35	TC4051BP	IC	TOSHIBA
IC36	NJM082D	IC	JRC
IC37	NJM082D	IC	JRC
IC38	TC4053BP	IC	TOSHIBA
IC40	NJM082D	IC	JRC
IC41	NJM082D	IC	JRC
IC42	BA6110	IC	ROHM
IC43	TC4053BP	IC	TOSHIBA
IC44	NJM082D	IC	JRC
IC46	NJM082D	IC	JRC
IC47	NJM082D	IC	JRC
IC48	NJM082D	IC	JRC
IC49	TC4053BP	IC	TOSHIBA
IC50	TC4051BP	IC	TOSHIBA
IC51	TC4051BP	IC	TOSHIBA
IC52	TC4051BP	IC	TOSHIBA
IC53	TC4051BP	IC	TOSHIBA
IC54	TC4053BP	IC	TOSHIBA
IC55	TC4053BP	IC	TOSHIBA
IC56	TC4069UBP	IC	TOSHIBA
IC57	NJM082D	IC	JRC
IC58	TC4011BP	IC	TOSHIBA
IC59	TC4053BP	IC	TOSHIBA
IC60	TL082CP	IC	TEXAS

Symbol No.	Part No.	Part Name	Description
Q1	2SC829(C)	Transistor	MATSUSHITA
Q2	2SC829(C)	Transistor	MATSUSHITA
Q3	2SA564(R)	Transistor	MATSUSHITA
Q4	2SA564(R)	Transistor	MATSUSHITA
Q5	2SA564(R)	Transistor	MATSUSHITA
Q6	2SA564(R)	Transistor	MATSUSHITA
Q7	2SA564(R)	Transistor	MATSUSHITA
Q8	2SA564(R)	Transistor	MATSUSHITA
Q9	2SK163(M.N)	FET	NEC
Q10	2SK163(M.N)	FET	NEC
Q11	2SK163(M.N)	FET	NEC
Q12	2SC829(C)	Transistor	MATSUSHITA
Q13	2SC829(C)	Transistor	MATSUSHITA
Q14	2SC829(C)	Transistor	MATSUSHITA
Q15	2SA564(R)	Transistor	MATSUSHITA
Q16	2SA564(R)	Transistor	MATSUSHITA
Q17	2SC829(C)	Transistor	MATSUSHITA
Q18	2SA838(C)	Transistor	MATSUSHITA
Q20	2SA564(R)	Transistor	MATSUSHITA
Q21	2SK163(M.N)	FET	NEC
Q22	2SA564(R)	Transistor	MATSUSHITA
Q23	2SA564(R)	Transistor	MATSUSHITA
Q24	2SA564(R)	Transistor	MATSUSHITA
Q25	2SK163(M.N)	FET	NEC
Q26	2SA564(R)	Transistor	MATSUSHITA
Q27	2SC1685(R)	Transistor	MATSUSHITA
Q28	2SK163(M.N)	FET	NEC
Q29	2SC1685(R)	Transistor	MATSUSHITA
Q30	2SK163(M.N)	FET	NEC
Q31	2SC1685(R)	Transistor	MATSUSHITA
Q32	2SK163(M.N)	FET	NEC
Q33	2SC1685(R)	Transistor	MATSUSHITA
Q34	2SK163(M.N)	FET	NEC
Q35	2SC1685(R)	Transistor	MATSUSHITA
Q36	2SK163(M.N)	FET	NEC
Q37	2SA564(R)	Transistor	MATSUSHITA
Q38	2SA564(R)	Transistor	MATSUSHITA
Q39	2SC1685(R)	Transistor	MATSUSHITA
Q40	2SK163(M.N)	FET	NEC
Q41	2SA564(R)	Transistor	MATSUSHITA
D1	MA165	Diode	MATSUSHITA
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	MA165	Diode	MATSUSHITA
D5	MA165	Diode	MATSUSHITA
D6	MA165	Diode	MATSUSHITA
D7	MA165	Diode	MATSUSHITA
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA
D11	MA165	Diode	MATSUSHITA
D12	MA165	Diode	MATSUSHITA
D13	MA165	Diode	MATSUSHITA
D14	MA165	Diode	MATSUSHITA
D15	MA165	Diode	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
D16	MA165	Diode	MATSUSHITA
D17	MA165	Diode	MATSUSHITA
D18	MA165	Diode	MATSUSHITA
D19	MA165	Diode	MATSUSHITA
D20	MA165	Diode	MATSUSHITA
D21	MA165	Diode	MATSUSHITA
D22	MA165	Diode	MATSUSHITA
D23	MA165	Diode	MATSUSHITA
D24	MA165	Diode	MATSUSHITA
D25	MA165	Diode	MATSUSHITA
D26	MA165	Diode	MATSUSHITA
D27	MA165	Diode	MATSUSHITA
D28	MA165	Diode	MATSUSHITA
D29	MA165	Diode	MATSUSHITA
D30	MA165	Diode	MATSUSHITA
D31	MA165	Diode	MATSUSHITA
D32	MA165	Diode	MATSUSHITA
D33	MA165	Diode	MATSUSHITA
D34	MA165	Diode	MATSUSHITA
D35	MA165	Diode	MATSUSHITA
D36	MA165	Diode	MATSUSHITA
D37	MA165	Diode	MATSUSHITA
D38	MA165	Diode	MATSUSHITA
D39	MA165	Diode	MATSUSHITA
D40	MA165	Diode	MATSUSHITA
D41	MA165	Diode	MATSUSHITA
D42	MA165	Diode	MATSUSHITA
D43	MA165	Diode	MATSUSHITA
D44	MA165	Diode	MATSUSHITA
D45	MA165	Diode	MATSUSHITA
D46	MA165	Diode	MATSUSHITA
D47	MA165	Diode	MATSUSHITA
D48	MA165	Diode	MATSUSHITA
D49	MA165	Diode	MATSUSHITA
D50	MA165	Diode	MATSUSHITA
D51	MA165	Diode	MATSUSHITA
D52	MA165	Diode	MATSUSHITA
D53	MA165	Diode	MATSUSHITA
D54	MA165	Diode	MATSUSHITA
D55	MA165	Diode	MATSUSHITA
D56	MA165	Diode	MATSUSHITA
D57	MA165	Diode	MATSUSHITA
D58	MA165	Diode	MATSUSHITA
D59	MA165	Diode	MATSUSHITA
D60	MA165	Diode	MATSUSHITA
D70	MA165	Diode	MATSUSHITA
R1	QRD161J-820	CR	82 1/6 W
R2	QRD161J-821	CR	820 1/6 W
R3	QRD161J-122	CR	1.2 K 1/6 W
R4	QRD161J-103	CR	10 K 1/6 W
R5	QRD161J-152	CR	1.5 K 1/6 W
R6	QRD161J-152	CR	1.5 K 1/6 W
R7	QRV141F-3901AY	MFR	3.9 K 1/4 W
R8	QRV141F-4700AY	MFR	470 1/4 W
R9	QRV141F-3901AY	MFR	3.9 K 1/4 W
R10	QRV141F-4700AY	MFR	47 1/4 W

Symbol No.	Part No.	Part Name	Description	
R11	QRD161J-222	CR	2.2 K	1/6 W
R12	QRD161J-222	CR	2.2 K	1/6 W
R13	QRD141F-2201AY	MFR	2.2 K	1/4 W
R14	QRV161J-222	CR	2.2 K	1/6 W
R15	QRD161J-223	CR	22 K	1/6 W
R16	QRD161J-682	CR	6.8 K	1/6 W
R17	QRD161J-102	CR	1 K	1/6 W
R18	QRD161J-471	CR	470	1/6 W
R19	QRV141F-3901AY	MFR	3.9 K	1/4 W
R20	QRV141F-4700AY	MFR	470	1/4 W
R21	QRV141F-3901AY	MFR	3.9 K	1/4 W
R22	QRV141F-4700AY	MFR	470	1/4 W
R23	QRD161J-222	CR	2.2 K	1/6 W
R24	QRD161J-222	CR	2.2 K	1/6 W
R25	QRV141F-2201AY	MFR	2.2 K	1/4 W
R26	QRD161J-222	CR	2.2 K	1/6 W
R27	QRD161J-223	CR	22 K	1/6 W
R28	QRD161J-102	CR	1 K	1/6 W
R29	QRD161J-471	CR	470	1/6 W
R30	QRV141F-3901AY	MFR	3.9 K	1/4 W
R31	QRV141F-4700AY	MFR	470	1/4 W
R32	QRV141F-3901AY	MFR	3.9 K	1/4 W
R33	QRV141F-4700AY	MFR	470	1/4 W
R34	QRD161J-222	CR	2.2 K	1/6 W
R35	QRD161J-222	CR	2.2 K	1/6 W
R36	QRV141F-2201AY	MFR	2.2 K	1/4 W
R37	QRD161J-222	CR	2.2 K	1/6 W
R38	QRD161J-223	CR	22 K	1/6 W
R39	QRD161J-102	CR	1 K	1/6 W
R40	QRD161J-102	CR	1 K	1/6 W
R41	QRD161J-471	CR	470	1/6 W
R42	QRD161J-104	CR	100 K	1/6 W
R43	QRD161J-102	CR	1 K	1/6 W
R44	QRD161J-221	CR	220	1/6 W
R45	QRD161J-562	CR	5.6 K	1/6 W
R46	QRD161J-102	CR	1 K	1/6 W
R47	QRD161J-102	CR	1 K	1/6 W
R48	QRD161J-221	CR	220	1/6 W
R49	QRD161J-562	CR	5.6 K	1/6 W
R50	QRD161J-102	CR	1 K	1/6 W
R51	QRD161J-102	CR	1 K	1/6 W
R52	QRD161J-221	CR	220	1/6 W
R53	QRD161J-562	CR	5.6 K	1/6 W
R54	QRD161J-102	CR	1 K	1/6 W
R55	QRD161J-102	CR	1 K	1/6 W
R56	QRV141F-3901AY	MFR	3.9 K	1/4 W
R57	QRV141F-4700AY	MFR	470	1/4 W
R58	QRV141F-4700AY	MFR	470	1/4 W
R59	QRV141F-3901AY	MFR	3.9 K	1/4 W
R60	QRD161J-682	CR	6.8 K	1/6 W
R61	QRD161J-102	CR	1 K	1/6 W
R62	QRD161J-102	CR	1 K	1/6 W
R63	QRD161J-472	CR	4.7 K	1/6 W
R64	QRD161J-471	CR	470	1/6 W
R65	QRD161J-122	CR	1.2 K	1/6 W
R66	QRD161J-102	CR	1 K	1/6 W
R67	QRD161J-272	CR	2.7 K	1/6 W
R68	QRD161J-681	CR	680	1/6 W
R69	QRD161J-153	CR	15 K	1/6 W
R70	QRD161J-821	CR	820	1/6 W

Symbol No.	Part No.	Part Name	Description	
R71	QRD161J-471	CR	470	1/6 W
R72	QRD161J-102	CR	1 K	1/6 W
R73	QVPB613-202	VR	2 K	
R74	QRD161J-102	CR	1 K	1/6 W
R75	QRD161J-103	CR	10 K	1/6 W
R76	QRD161J-103	CR	10 K	1/6 W
R77	QRD161J-223	CR	22 K	1/6 W
R109	QRD161J-222	CR	2.2 K	1/6 W
R110	QRD161J-104	CR	100 K	1/6 W
R111	QRD161J-222	CR	2.2 K	1/6 W
R112	QRD161J-222	CR	2.2 K	1/6 W
R130	QRD161J-103	CR	10 K	1/6 W
R131	QRD161J-103	CR	10 K	1/6 W
R132	QRD161J-103	CR	10 K	1/6 W
R133	QRD161J-103	CR	10 K	1/6 W
R144	QRD161J-103	CR	10 K	1/6 W
R145	QRD161J-103	CR	10 K	1/6 W
R146	QRD161J-103	CR	10 K	1/6 W
R147	QRD161J-103	CR	10 K	1/6 W
R148	QRD161J-103	CR	10 K	1/6 W
R149	QRD161J-103	CR	10 K	1/6 W
R150	QRD161J-102	CR	1 K	1/6 W
R151	QRD161J-102	CR	1 K	1/6 W
R152	QRD161J-683	CR	68 K	1/6 W
R153	QRD161J-683	CR	68 K	1/6 W
R154	QVPB613-204	VR	200 K	
R155	QVPB613-204	VR	200 K	
R156	QRD161J-472	CR	4.7 K	1/6 W
R157	QRD161J-472	CR	4.7 K	1/6 W
R158	QRD161J-104	CR	100 K	
R159	QRD161J-103	CR	10 K	
R160	QRD161J-222	CR	2.2 K	
R161	QRD161J-333	CR	33 K	
R162	QRD161J-103	CR	10 K	1/6 W
R163	QRD161J-103	CR	10 K	1/6 W
R164	QRD161J-103	CR	10 K	1/6 W
R165	QVPB613-103	VR	10 K	
R166	QRD161J-104	CR	100 K	1/6 W
R167	QVPB613-103	VR	10 K	
R168	QRD161J-103	CR	10 K	1/6 W
R169	QRD161J-103	CR	10 K	1/6 W
R170	QRD161J-472	CR	4.7 K	1/6 W
R171	QVPB613-102	VR	1 K	
R172	QRD161J-562	CR	5.6K	1/6 W
R173	QRD161J-222	CR	2.2 K	1/6 W
R174	QRD161J-682	CR	6.8 K	1/6 W
R175	QRD161J-822	CR	8.2 K	1/6 W
R176	QRD161J-823	CR	82 K	1/6 W
R177	QRD161J-471	CR	470	1/6 W
R178	QRD161J-471	CR	470	1/6 W
R179	QRD161J-182	CR	1.8 K	1/6 W
R180	QRD161J-223	CR	22 K	1/6 W
R181	QRD161J-223	CR	22 K	1/6 W
R182	QRD161J-153	CR	15 K	1/6 W
R183	QRD161J-332	CR	3.3 K	1/6 W
R184	QRD161J-332	CR	3.3 K	1/6 W
R185	QRD161J-332	CR	3.3 K	1/6 W

Symbol No.	Part No.	Part Name	Description
R186	QRD161J-103	CR	10 K 1/6 W
R187	QRD161J-221	CR	220 1/6 W
R188	QRD161J-221	CR	220 1/6 W
R189	QRD161J-472	CR	4.7 K 1/6 W
R190	QVPB613-102	VR	1 K
R191	QRD161J-222	CR	2.2 K 1/6 W
R192	QRD161J-473	CR	47 K 1/6 W
R193	QVPB613-103	VR	10 K
R194	QRD161J-393	CR	39 K 1/6 W
R195	QVPB613-102	VR	1 K
R196	QRD161J-220	CR	22 1/6 W
R197	QRD161J-682	CR	6.8 K 1/6 W
R198	QVPB613-202	VR	2 K
R199	QRD161J-682	CR	6.8 K 1/6 W
R200	QRD161J-222	CR	2.2 K 1/6 W
R201	QRD161J-152	CR	1.5 K 1/6 W
R202	QRD161J-223	CR	22 K 1/6 W
R203	QVPB613-103	VR	10 K
R204	QRD161J-152	CR	1.5 K 1/6 W
R205	QRD161J-102	CR	1 K 1/6 W
R206	QRD161J-471	CR	470 1/6 W
R207	QRD161J-103	CR	10 K 1/6 W
R208	QVPB613-102	VR	1 K
R209	QRD161J-103	CR	10 K 1/6 W
R210	QRD161J-103	CR	10 K 1/6 W
R211	QRD161J-103	CR	10 K 1/6 W
R212	QRD161J-103	CR	10 K 1/6 W
R213	QRD161J-103	CR	10 K 1/6 W
R214	QRD161J-103	CR	10 K 1/6 W
R216	QRD161J-103	CR	10 K 1/6 W
R217	QRD161J-103	CR	10 K 1/6 W
R218	QRD161J-103	CR	10 K 1/6 W
R219	QRD161J-103	CR	10 K 1/6 W
R220	QRD161J-103	CR	10 K 1/6 W
R221	QRD161J-103	CR	10 K 1/6 W
R222	QRD161J-103	CR	10 K 1/6 W
R223	QRD161J-102	CR	1 K 1/6 W
R224	QRD161J-102	CR	1 K 1/6 W
R225	QRD161J-683	CR	68 K 1/6 W
R226	QRD161J-683	CR	68 K 1/6 W
R227	QVPB613-204	VR	200 K
R228	QVPB613-204	VR	200 K
R229	QRD161J-104	CR	100 K 1/6 W
R230	QRD161J-103	CR	10 K 1/6 W
R231	QRD161J-222	CR	2.2 K 1/6 W
R232	QRD161J-333	CR	33 K 1/6 W
R233	QRD161J-472	CR	4.7 K 1/6 W
R234	QRD161J-472	CR	4.7 K 1/6 W
R235	QRD161J-103	CR	10 K 1/6 W
R236	QRD161J-103	CR	10 K 1/6 W
R237	QRD161J-103	CR	10 K 1/6 W
R238	QVPB613-103	VR	10 K
R239	QRD161J-104	CR	100 K 1/6 W
R240	QRD161J-103	CR	10 K 1/6 W
R241	QRD161J-103	CR	10 K 1/6 W
R242	QRD161J-392	CR	3.9 K 1/6 W
R243	QVPB613-102	VR	1 K
R244	QRD161J-472	CR	4.7 K 1/6 W
R245	QVPB613-103	VR	10 K

Symbol No.	Part No.	Part Name	Description
R246	QRD161J-222	CR	2.2 K 1/6 W
R247	QRD161J-682	CR	6.8 K 1/6 W
R248	QRD161J-822	CR	8.2 K 1/6 W
R249	QRD161J-471	CR	470 1/6 W
R250	QRD161J-471	CR	470 1/6 W
R251	QRD161J-182	CR	1.8 K 1/6 W
R252	QRD161J-823	CR	82 K 1/6 W
R253	QRD161J-103	CR	10 K 1/6 W
R254	QRD161J-332	CR	3.3 K 1/6 W
R255	QRD161J-104	CR	100 K 1/6 W
R256	QRD161J-104	CR	100 K 1/6 W
R257	QRD161J-472	CR	4.7 K 1/6 W
R258	QRD161J-103	CR	10 K 1/6 W
R259	QRD161J-153	CR	15 K 1/6 W
R260	QRD161J-471	CR	470 1/6 W
R261	QRD161J-102	CR	1 K 1/6 W
R262	QRD161J-103	CR	10 K 1/6 W
R264	QRD161J-332	CR	3.3 K 1/6 W
R265	QRD161J-104	CR	100 K 1/6 W
R266	QRD161J-104	CR	100 K 1/6 W
R267	QRD161J-472	CR	4.7 K 1/6 W
R268	QRD161J-103	CR	10 K 1/6 W
R269	QRD161J-153	CR	15 K 1/6 W
R270	QRD161J-471	CR	470 1/6 W
R271	QRD161J-102	CR	1 K 1/6 W
R272	QRD161J-471	CR	470 1/6 W
R273	QRD161J-102	CR	1 K 1/6 W
R274	QRD161J-682	CR	6.8 K 1/6 W
R275	QVPB613-202	VR	2 K
R276	QRD161J-682	CR	6.8 K 1/6 W
R277	QRD161J-823	CR	82 K 1/6 W
R278	QRD161J-223	CR	22 K 1/6 W
R279	QRD161J-103	CR	10 K 1/6 W
R280	QRD161J-123	CR	12 K 1/6 W
R281	QVPB613-502	VR	5 K
R282	QRD161J-222	CR	2.2 K 1/6 W
R283	QRD161J-103	CR	10 K 1/6 W
R284	QRD161J-103	CR	10 K 1/6 W
R285	QRD161J-561	CR	560 1/6 W
R286	QRD161J-472	CR	4.7 K 1/6 W
R287	QRD161J-561	CR	560 1/6 W
R288	QRD161J-472	CR	4.7 K 1/6 W
R289	QRD161J-223	CR	22 K 1/6 W
R290	QRD161J-223	CR	22 K 1/6 W
R291	QRD161J-561	CR	560 1/6 W
R292	QRD161J-561	CR	560 1/6 W
R293	QRD161J-472	CR	4.7 K 1/6 W
R294	QRD161J-472	CR	4.7 K 1/6 W
R295	QRD161J-223	CR	22 K 1/6 W
R296	QRD161J-223	CR	22 K 1/6 W
R297	QRD161J-103	CR	10 K 1/6 W
R298	QVPB613-502	VR	5 K
R299	QRD161J-822	CR	8.2 K 1/6 W
R300	QRD161J-104	CR	100 K 1/6 W
R301	QRD161J-103	CR	10 K 1/6 W
R302	QRD161J-222	CR	2.2 K 1/6 W
R303	QRD161J-561	CR	560 1/6 W
R304	QRD161J-472	CR	4.7 K 1/6 W
R305	QRD161J-472	CR	4.7 K 1/6 W

Symbol No.	Part No.	Part Name	Description	
R306	QRD161J-223	CR	22 K	1/6 W
R307	QRD161J-103	CR	10 K	1/6 W
R308	QVPB613-502	VR	5 K	
R309	QRD161J-472	CR	4.7 K	1/6 W
R310	QRD161J-561	CR	560	1/6 W
R311	QRD161J-472	CR	4.7 K	1/6 W
R312	QRD161J-122	CR	1.2 K	1/6 W
R313	QVPB613-502	VR	5 K	
R314	QRD161J-122	CR	1.2 K	1/6 W
R315	QRD161J-223	CR	22 K	1/6 W
R316	QRD161J-220	CR	22 K	1/6 W
R317	QRD161J-681	CR	680	1/6 W
R318	QVPB613-103	VR	10 K	
R319	QRD161J-821	CR	820	1/6 W
R320	QRD161J-182	CR	1.8 K	1/6 W
R321	QRD161J-222	CR	2.2 K	1/6 W
R322	QRD161J-122	CR	1.2 K	1/6 W
R323	QRD161J-221	CR	220	1/6 W
R324	QRD161J-121	CR	120	1/6 W
R325	QRD161J-471	CR	470	1/6 W
R326	QRD161J-821	CR	820	1/6 W
R327	QRD161J-182	CR	1.8 K	1/6 W
R328	QRD161J-222	CR	2.2 K	1/6 W
R329	QRD161J-122	CR	1.2 K	1/6 W
R330	QRD161J-221	CR	220	1/6 W
R331	QRD161J-121	CR	120	1/6 W
R332	QRD161J-471	CR	470	1/6 W
R333	QRD161J-821	CR	820	1/6 W
R334	QRD161J-182	CR	1.8 K	1/6 W
R335	QRD161J-222	CR	2.2 K	1/6 W
R336	QRD161J-122	CR	1.2 K	1/6 W
R337	QRD161J-221	CR	220	1/6 W
R338	QRD161J-121	CR	120	1/6 W
R339	QRD161J-471	CR	470	1/6 W
R340	QRD161J-821	CR	820	1/6 W
R341	QRD161J-182	CR	1.8 K	1/6 W
R342	QRD161J-222	CR	2.2 K	1/6 W
R343	QRD161J-122	CR	1.2 K	1/6 W
R344	QRD161J-221	CR	220	1/6 W
R345	QRD161J-121	CR	120	1/6 W
R346	QRD161J-471	CR	470	1/6 W
R347	QRD161J-473	CR	47 K	1/6 W
R348	QRD161J-473	CR	47 K	1/6 W
R349	QRD161J-473	CR	47 K	1/6 W
R350	QRD161J-473	CR	47 K	1/6 W
R351	QRD161J-473	CR	47 K	1/6 W
R352	QRD161J-473	CR	47 K	1/6 W
R353	QRD161J-473	CR	47 K	1/6 W
R354	QRD161J-473	CR	47 K	1/6 W
R355	QRD161J-473	CR	47 K	1/6 W
R356	QRD161J-473	CR	47 K	1/6 W
R357	QRD161J-473	CR	47 K	1/6 W
R358	QVPB613-202	VR	2 K	
R360	QRD161J-103	CR	10 K	1/6 W
R361	QRD161J-103	CR	10 K	1/6 W
R362	QRD161J-223	CR	22 K	1/6 W
R363	QRD161J-223	CR	22 K	1/6 W
R364	QRD161J-102	CR	1 K	1/6 W
R368	QRD161J-470	CR	47	1/6 W

Symbol No.	Part No.	Part Name	Description	
R369	QRD161J-222	CR	2.2 K	1/6 W
R370	QRD161J-223	CR	5.6 K	1/6 W
R371	QRD161J-223	CR	22 K	1/6 W
R372	QRD161J-223	CR	22 K	1/6 W
R373	QRD161J-223	CR	22 K	1/6 W
R400	QRD161J-333	CR	33 K	1/6 W
R401	QRD161J-334	CR	330 K	1/6 W
R402	QRD161J-103	CR	10 K	1/6 W
R403	QRD161J-183	CR	18 K	1/6 W
R404	QVPB614-502	VR	5 K	
R405	QVPB614-502	VR	5 K	
R406	QRD161J-101	CR	100	1/6 W
R407	QRD161J-472	CR	4.7 K	1/6 W
R408	QRD161J-472	CR	4.7 K	1/6 W
C1	QETA1CM-476	E Cap	47	16 V
C2	QCS11HJ-150	C Cap	15 P	50 V
C3	QETA1EM-476	E Cap	47	25 V
C4	QETA1CM-476	E Cap	47	16 V
C5	QCS11HJ-270	C Cap	27 P	50 V
C6	QCS11HJ-390	C Cap	39 P	50 V
C7	QETA1CM-476	E Cap	47	16 V
C8	QETA1CM-476	E Cap	47	16 V
C9	QETA1CM-476	E Cap	47	16 V
C10	QFN41HJ-473	MY Cap	0.047	50 V
C11	QCS11HJ-473	MY Cap	0.047	50 V
C12	QCS11HJ-473	MY Cap	0.047	50 V
C13	QETA1EM-476	E Cap	47	25 V
C14	QETA1CM-476	E Cap	47	16 V
C15	QCF11HP-103	C Cap	0.01	50 V
C16	QCF11HP-103	C Cap	0.01	50 V
C17	QCF11HP-103	C Cap	0.01	50 V
C18	QETA1EM-476	E Cap	47	25 V
C19	QETA1EM-476	E Cap	47	25 V
C20	QETA1EM-476	E Cap	47	25 V
C21	QETA1EM-476	E Cap	47	25 V
C22	QETA1EM-107	E Cap	100	25 V
C23	QETA1EM-107	E Cap	100	25 V
C24	QETA1EM-107	E Cap	100	25 V
C25	QETA1EM-107	E Cap	100	25 V
C26	QETA1EM-476	E Cap	47	25 V
C27	QCS11HJ-560	C Cap	56 P	50 V
C28	QCS11HJ-270	C Cap	27 P	50 V
C29	QETA1EM-476	E Cap	47	25 V
C30	QETA1EM-476	E Cap	47	25 V
C31	QCF11HP-103	C Cap	0.01	50 V
C32	QCF11HP-103	C Cap	0.01	50 V
C33	QETA1CM-476	E Cap	47	16 V
C34	QETA1CM-476	E Cap	47	16 V
C35	QETA1CM-476	E Cap	47	16 V
C36	QETA1CM-476	E Cap	47	16 V
C50	QCF11HP-103	C Cap	0.01	50 V

Symbol No.	Part No.	Part Name	Description
C51	QCS11HJ-101	C Cap	100 P 50 V
C52	QCS11HJ-101	C Cap	100 P 50 V
C53	QEPA1HM-105	E Cap	1 50 V
C54	QCF11HP-103	C Cap	0.01 50 V
C55	QCS11HJ-221	C Cap	220 P 50 V
C56	QCT25CH-221	C Cap	220 P 50 V
C57	QRD161J-0R0	CR	0 Ω 1/6 W
C59	QCF11HP-103	C Cap	0.01 50 V
C64	QCS11HJ-680	C Cap	68 P 50 V
C65	QCF11HP-103	C Cap	0.01 50 V
C66	QCF11HP-103	C Cap	0.01 50 V
C67	QCF11HP-103	C Cap	0.01 50 V
C68	QCF11HP-103	C Cap	0.01 50 V
C69	QCF11HP-103	C Cap	0.01 50 V
C70	QCF11HP-103	C Cap	0.01 50 V
C71	QCS11HJ-101	C Cap	100 P 50 V
C72	QCS11HJ-101	C Cap	100 P 50 V
C73	QFN41HJ-104	MY Cap	0.1 50 V
C74	QCS11HJ-221	C Cap	220 P 50 V
C75	QFN41HJ-104	MY Cap	0.1 50 V
C76	QCF11HP-103	C Cap	0.01 50 V
C78	QCF11HP-103	C Cap	0.01 50 V
C83	QCF11HP-103	C Cap	0.01 50 V
C84	QCZ0206-104	C Cap	0.1
C85	QCF11HP-103	C Cap	0.01 50 V
C86	QCF11HP-103	C Cap	0.01 50 V
C87	QETA1EM-476	E Cap	47 25 V
C88	QETA1EM-476	E Cap	47 25 V
C89	QEPA1HM-105	E Cap	1 50 V
C90	QEPA1HM-105	E Cap	1 50 V
C91	QEPA1HM-105	E Cap	1 50 V
C92	QEPA1HM-105	E Cap	1 50 V
C93	QCF11HP-103	C Cap	0.01 50 V
C94	QCF11HP-103	C Cap	0.01 50 V
C95	QEPA1EM-475	E Cap	47 25 V
C96	QEPA1EM-475	E Cap	47 25 V
C97	QCF11HP-103	C Cap	0.01 50 V
C98	QCF11HP-103	C Cap	0.01 50 V
C99	QEPA1HM-105	E Cap	1 50 V
C100	QCS11HJ-101	C Cap	100 P 50 V
C101	QETA1EM-476	E Cap	47 25 V
C102	QETA1EM-476	E Cap	47 25 V
C103	QETA1EM-476	E Cap	47 25 V
C104	QETA1EM-476	E Cap	47 25 V
C105	QETA1EM-476	E Cap	47 25 V
C106	QETA1EM-476	E Cap	47 25 V
C107	QETA1EM-476	E Cap	47 25 V
C108	QETA1EM-476	E Cap	47 25 V
C109	QETA1EM-476	E Cap	47 25 V
C110	QETA1EM-476	E Cap	47 25 V
C111	QETA1EM-476	E Cap	47 25 V
C112	QETA1EM-476	E Cap	47 25 V
C113	QETA1EM-476	E Cap	47 25 V
C114	QETA1EM-476	E Cap	47 25 V
C115	QETA1EM-476	E Cap	47 25 V
C116	QETA1EM-476	E Cap	47 25 V
C117	QETA1EM-476	E Cap	47 25 V
C118	QETA1EM-476	E Cap	47 25 V
C119	QETA1EM-476	E Cap	47 25 V

Symbol No.	Part No.	Part Name	Description
C120	QETA1EM-476	E Cap	47 25 V
C121	QETA1EM-476	E Cap	47 25 V
C122	QETA1EM-476	E Cap	47 25 V
C123	QETA1EM-476	E Cap	47 25 V
C124	QETA1EM-476	E Cap	47 25 V
C125	QETA1EM-476	E Cap	47 25 V
C126	QCF11HP-103	C Cap	0.01 50 V
C127	QCF11HP-103	C Cap	0.01 50 V
C128	QCF11HP-103	C Cap	0.01 50 V
C129	QCF11HP-103	C Cap	0.01 50 V
C130	QCF11HP-103	C Cap	0.01 50 V
C131	QCF11HP-103	C Cap	0.01 50 V
C132	QCF11HP-103	C Cap	0.01 50 V
C133	QCF11HP-103	C Cap	0.01 50 V
C134	QCF11HP-103	C Cap	0.01 50 V
C135	QCF11HP-103	C Cap	0.01 50 V
C136	QCF11HP-103	C Cap	0.01 50 V
C137	QCF11HP-103	C Cap	0.01 50 V
C138	QCF11HP-103	C Cap	0.01 50 V
C139	QCF11HP-103	C Cap	0.01 50 V
C140	QCF11HP-103	C Cap	0.01 50 V
C141	QCF11HP-103	C Cap	0.01 50 V
C142	QCF11HP-103	C Cap	0.01 50 V
C143	QCF11HP-103	C Cap	0.01 50 V
C144	QCF11HP-103	C Cap	0.01 50 V
C145	QCF11HP-103	C Cap	0.01 50 V
C146	QCF11HP-103	C Cap	0.01 50 V
C147	QCF11HP-103	C Cap	0.01 50 V
C148	QCF11HP-103	C Cap	0.01 50 V
C149	QCF11HP-103	C Cap	0.01 50 V
C150	QCF11HP-103	C Cap	0.01 50 V
C151	QCF11HP-103	C Cap	0.01 50 V
C152	QCF11HP-103	C Cap	0.01 50 V
C153	QCF11HP-103	C Cap	0.01 50 V
C154	QCF11HP-103	C Cap	0.01 50 V
C155	QCF11HP-103	C Cap	0.01 50 V
C156	QCF11HP-103	C Cap	0.01 50 V
C157	QCF11HP-103	C Cap	0.01 50 V
C158	QCF11HP-103	C Cap	0.01 50 V
C159	QCF11HP-103	C Cap	0.01 50 V
C160	QCF11HP-103	C Cap	0.01 50 V
C161	QCF11HP-103	C Cap	0.01 50 V
C162	QCF11HP-103	C Cap	0.01 50 V
C163	QCF11HP-103	C Cap	0.01 50 V
C164	QCF11HP-103	C Cap	0.01 50 V
C165	QCF11HP-103	C Cap	0.01 50 V
C166	QCF11HP-103	C Cap	0.01 50 V
C167	QCF11HP-103	C Cap	0.01 50 V
C168	QCF11HP-103	C Cap	0.01 50 V
C169	QCF11HP-103	C Cap	0.01 50 V
C170	QCF11HP-103	C Cap	0.01 50 V
C171	QCF11HP-103	C Cap	0.01 50 V
C172	QCF11HP-103	C Cap	0.01 50 V
C173	QCF11HP-103	C Cap	0.01 50 V
C174	QCF11HP-103	C Cap	0.01 50 V
C175	QCF11HP-103	C Cap	0.01 50 V
C176	QCF11HP-103	C Cap	0.01 50 V
C177	QCF11HP-103	C Cap	0.01 50 V
C178	QCF11HP-103	C Cap	0.01 50 V

Symbol No.	Part No.	Part Name	Description
C179	QCF11HP-103	C Cap	0.01 50 V
C180	QCF11HP-103	C Cap	0.01 50 V
C181	QCF11HP-103	C Cap	0.01 50 V
C182	QCF11HP-103	C Cap	0.01 50 V
C183	QCF11HP-103	C Cap	0.01 50 V
C184	QCF11HP-103	C Cap	0.01 50 V
C185	QCF11HP-103	C Cap	0.01 50 V
C186	QCF11HP-103	C Cap	0.01 50 V
C187	QCF11HP-103	C Cap	0.01 50 V
C188	QCF11HP-103	C Cap	0.01 50 V
C189	QCF11HP-103	C Cap	0.01 50 V
C190	QCF11HP-103	C Cap	0.01 50 V
C191	QCF11HP-103	C Cap	0.01 50 V
C192	QCF11HP-103	C Cap	0.01 50 V
C193	QCF11HP-103	C Cap	0.01 50 V
C194	QCF11HP-103	C Cap	0.01 50 V
C195	QCF11HP-103	C Cap	0.01 50 V
C196	QCF11HP-103	C Cap	0.01 50 V
C197	QCF11HP-103	C Cap	0.01 50 V
C198	QCF11HP-103	C Cap	0.01 50 V
C200	QEPA1HM-105	E Cap	1 50 V
C201	QEPA1HM-105	E Cap	1 50 V
C202	QETA1EM-476	E Cap	47 25 V
C203	QCZ0206-104	C Cap	0.1
C204	QCZ0206-104	C Cap	0.1
C205	QETA1EM-476	E Cap	47
C300	QETA1CM-476	E Cap	47 16 V
C301	QCS11HJ-470	C Cap	47 P 50 V
C302	QFN41HJ-104	MY Cap	0.1 50 V
C303	QCS11HJ-5R0	C Cap	5 P 50 V
C304	QEPA1HM-105	NP Cap	1 50 V
C305	QEPA1HM-105	NP Cap	1 50 V
C306	QEPA1HM-105	NP Cap	1 50 V
C307	QEPA1HM-105	NP Cap	1 50 V
RA1	QRB081K-103	R Network	10 K x 8
RA2	QRB081K-103	R Network	10 K x 8
RA3	QRB081K-103	R Network	10 K x 8
RA4	QRB081K-103	R Network	10 K x 8
CN3	SCV1197-090	Connector	90 Pin
CBM1	**CBMC3436-00A**	**DL-25 CBM**	
C1	NCT03UJ-330	C Cap	33 P
C2	NCT03UJ-680	C Cap	68 P
C3	NCT03UJ-680	C Cap	68 P
C4	NCT03UJ-680	C Cap	68 P
C5	NCT03UJ-680	C Cap	68 P
C6	NCT03UJ-680	C Cap	68 P

Symbol No.	Part No.	Part Name	Description
C7	NCT03UJ-680	C Cap	68 P
C8	NCT03UJ-680	C Cap	68 P
C9	NCT03UJ-330	C Cap	33 P
L1	SCV1488-120	Peaking Coil	12 µ
L2	SCV1488-120	Peaking Coil	12 µ
L3	SCV1488-120	Peaking Coil	12 µ
L4	SCV1488-120	Peaking Coil	12 µ
L5	SCV1488-120	Peaking Coil	12 µ
L6	SCV1488-120	Peaking Coil	12 µ
L7	SCV1488-120	Peaking Coil	12 µ
L8	SCV1488-120	Peaking Coil	12 µ
CBM2	**CBMC3437-00A**	**DL-50 CBM**	
C1	NCT03UJ-330	C Cap	33 P
C2	NCT03UJ-680	C Cap	68 P
C3	NCT03UJ-680	C Cap	68 P
C4	NCT03UJ-680	C Cap	68 P
C5	NCT03UJ-680	C Cap	68 P
C6	NCT03UJ-680	C Cap	68 P
C7	NCT03UJ-680	C Cap	68 P
C8	NCT03UJ-680	C Cap	68 P
C9	NCT03UJ-680	C Cap	68 P
C10	NCT03UJ-680	C Cap	68 P
C11	NCT03UJ-330	C Cap	33 P
C12	NCT03UJ-680	C Cap	68 P
C13	NCT03UJ-680	C Cap	68 P
C14	NCT03UJ-680	C Cap	68 P
C15	NCT03UJ-680	C Cap	68 P
C16	NCT03UJ-680	C Cap	68 P
C17	NCT03UJ-330	C Cap	33 P
L1	SCV1488-120	Peaking Coil	12 µ
L2	SCV1488-120	Peaking Coil	12 µ
L3	SCV1488-120	Peaking Coil	12 µ
L4	SCV1488-120	Peaking Coil	12 µ
L5	SCV1488-120	Peaking Coil	12 µ
L6	SCV1488-120	Peaking Coil	12 µ
L7	SCV1488-120	Peaking Coil	12 µ
L8	SCV1488-120	Peaking Coil	12 µ
L9	SCV1488-120	Peaking Coil	12 µ
L10	SCV1488-120	Peaking Coil	12 µ
L11	SCV1488-120	Peaking Coil	12 µ
L12	SCV1488-120	Peaking Coil	12 µ
L13	SCV1488-120	Peaking Coil	12 µ
L14	SCV1488-120	Peaking Coil	12 µ
L15	SCV1488-120	Peaking Coil	12 µ
L16	SCV1488-120	Peaking Coil	12 µ

Symbol No.	Part No.	Part Name	Description
CBM3	**CBMC3438-00A**	**DL-12 CBM**	
C1	NCT03UJ-330	C Cap	33 P
C2	NCT03UJ-680	C Cap	68 P
C3	NCT03UJ-680	C Cap	68 P
C4	NCT03UJ-680	C Cap	68 P
C5	NCT03UJ-330	C Cap	33 P
L1	SCV1488-120	Peaking Coil	12 μ
L2	SCV1488-120	Peaking Coil	12 μ
L3	SCV1488-120	Peaking Coil	12 μ
L4	SCV1488-120	Peaking Coil	12 μ
CBM5 – CBM8	**CBMC4351-00B**	**COMPA CBM**	
IC1	NJM1496M	IC	JRC
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SC2814(F4.5)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
C3	NCF21EZ-104	C Cap	0.1 25 V
C4	NCF21EZ-104	C Cap	0.1 25 V
C5	NCF21EZ-104	C Cap	0.1 25 V
CBM9 CBM11	**CBMC4354-00B**	**OR CBM**	
Q1	2SA1179(M5.6)	Transistor	SANYO
Q2	2SC2812(L5.6)	Transistor	SANYO
Q3	2SC2812(L5.6)	Transistor	SANYO
Q4	2SA1179(M5.6)	Transistor	SANYO
Q5	2SA1179(M5.6)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
D2	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V

Symbol No.	Part No.	Part Name	Description
CBM10 CBM12	**CBMC4354-00B**	**AND CBM**	
Q1	2SC2812(L5.6)	Transistor	SANYO
Q2	2SA1179(M5.6)	Transistor	SANYO
Q3	2SA1179(M5.6)	Transistor	SANYO
Q4	2SC2812(L5.6)	Transistor	SANYO
Q5	2SC2812(L5.6)	Transistor	SANYO
D1	MA152K	Diode	MATSUSHITA
D2	MA152K	Diode	MATSUSHITA
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
	● SSH board assembly		
IC7	VC1042	IC	ROHM
IC61	TC4053BP	IC	TOSHIBA
IC62	TC4053BP	IC	TOSHIBA
IC63	NJM082D	IC	JRC
IC64	NJM082D	IC	JRC
IC65	NJM082D	IC	JRC
R374	QRD161J-470	CR	47 1/6 W
R375	QRD161J-470	CR	47 1/6 W
R376	QRD161J-470	CR	47 1/6 W
R377	QRD161J-470	CR	47 1/6 W
R378	QRD161J-470	CR	47 1/6 W
R379	QRD161J-470	CR	47 1/6 W
C206	QFN41HJ-103	MY Cap	0.01 50 V
C207	QFN41HJ-103	MY Cap	0.01 50 V
C208	QFN41HJ-103	MY Cap	0.01 50 V
C209	QFN41HJ-103	MY Cap	0.01 50 V
C210	QFN41HJ-103	MY Cap	0.01 50 V
C211	QFN41HJ-103	MY Cap	0.01 50 V

6.6 BC (NTSC)/(PAL) board assembly 06

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Symbol No.	Part No.	Part Name	Description
IC1	TC4094BP	IC	TOSHIBA
IC2	TC4094BP	IC	TOSHIBA
IC3	LR74HC245	IC	SHARP
IC4	LR74HC245	IC	SHARP
IC5	VC1042	IC	ROHM
IC6	NJM4560DD	IC	JRC
IC7	NJM4560DD	IC	JRC
IC8	NJM4560DD	IC	JRC
IC9	NJM4560DD	IC	JRC
IC10	AN6914	IC	MATSUSHITA
IC11	NJM4560DD	IC	JRC
IC12	NJM082D	IC	JRC
IC13	NJM082D	IC	JRC
IC14	TC4053BP	IC	TOSHIBA
IC15	TC4013BAP	IC	TOSHIBA
IC16	TC4001BP	IC	TOSHIBA
IC17	TC4011BP	IC	TOSHIBA
IC18	TC4013BAP	IC	TOSHIBA
IC19	TC4011BP	IC	TOSHIBA
IC20	TC4538BP	IC	TOSHIBA
IC21	TC4069UBP	IC	TOSHIBA
IC22	TC4053BP	IC	TOSHIBA
IC23	NJM319D	IC	JRC
IC24	NJM062D	IC	JRC
IC25	NJM4560DD	IC	JRC
IC26	TC4053BP	IC	TOSHIBA
IC27	TC4053BP	IC	TOSHIBA
IC28	AN614	IC	MATSUSHITA
IC29	AN614	IC	MATSUSHITA
IC30	AN614	IC	MATSUSHITA
IC31	TC4013BAP	IC	TOSHIBA
IC32	NJM319D	IC	JRC
IC33	TC4013BAP	IC	TOSHIBA
IC34	NJM4560DD	IC	JRC
IC35	NJM4560DD	IC	JRC
IC36	TC4053BP	IC	TOSHIBA
IC37	NJM062D	IC	JRC
IC38	TC4053BP	IC	TOSHIBA
IC39	AN614	IC	MATSUSHITA
IC40	AN614	IC	MATSUSHITA
IC41	AN614	IC	MATSUSHITA
IC42	TC4053BP	IC	TOSHIBA
IC43	SCV0592-001	IC	JVC
IC44	TC40H193P	IC	TOSHIBA
IC45	SCV0270-001	IC	JVC
IC46	TC4053BP	IC	TOSHIBA
IC47	TC4053BP	IC	TOSHIBA(PAL only)
IC48	TC4069UBP	IC	TOSHIBA
IC49	TC4011BP	IC	TOSHIBA
IC50	TC4053BP	IC	TOSHIBA
Q1	2SC1685(R)	Transistor	MATSUSHITA
Q2	2SA564(R)	Transistor	MATSUSHITA
Q3	2SC1685(R)	Transistor	MATSUSHITA
Q4	2SC1685(R)	Transistor	MATSUSHITA
Q5	2SC1685(R)	Transistor	MATSUSHITA
Q6	2SC1685(R)	Transistor	MATSUSHITA
Q7	2SC1685(R)	Transistor	MATSUSHITA
Q8	2SC1685(R)	Transistor	MATSUSHITA
Q9	2SC1685(R)	Transistor	MATSUSHITA
Q10	2SC1685(R)	Transistor	MATSUSHITA
Q11	2SC1685(R)	Transistor	MATSUSHITA
Q12	2SC1685(R)	Transistor	MATSUSHITA
Q13	2SC1685(R)	Transistor	MATSUSHITA
Q14	2SC1685(R)	Transistor	MATSUSHITA
Q15	2SC1685(R)	Transistor	MATSUSHITA
Q16	2SC1685(R)	Transistor	MATSUSHITA
Q17	2SC1685(R)	Transistor	MATSUSHITA
Q18	2SC1685(R)	Transistor	MATSUSHITA
Q20	2SA564(R)	Transistor	MATSUSHITA
Q21	2SA564(R)	Transistor	MATSUSHITA
Q22	2SK163(M.N)	FET	NEC
Q23	2SA564(R)	Transistor	MATSUSHITA
Q24	2SA564(R)	Transistor	MATSUSHITA
Q25	2SK163(M.N)	FET	NEC
Q26	2SC1685(R)	Transistor	MATSUSHITA
Q27	2SC1685(R)	Transistor	MATSUSHITA
Q28	2SC1685(R)	Transistor	MATSUSHITA
Q29	2SC1685(R)	Transistor	MATSUSHITA
Q30	2SC1685(R)	Transistor	MATSUSHITA
Q34	2SC1685(R)	Transistor	MATSUSHITA
Q35	2SA564(R)	Transistor	MATSUSHITA
Q36	2SA564(R)	Transistor	MATSUSHITA
Q37	2SA564(R)	Transistor	MATSUSHITA
Q38	2SK163(M.N)	FET	NEC
Q39	2SA564(R)	Transistor	MATSUSHITA
Q40	2SA564(R)	Transistor	MATSUSHITA
Q41	2SK163(M.N)	FET	NEC
Q42	2SA564(R)	Transistor	MATSUSHITA
Q43	2SC1685(R)	Transistor	MATSUSHITA
Q44	2SC1685(R)	Transistor	MATSUSHITA
Q45	2SA564(R)	Transistor	MATSUSHITA (PAL only)
Q46	2SC1685(R)	Transistor	MATSUSHITA
Q47	2SC1685(R)	Transistor	MATSUSHITA
Q48	2SC1685(R)	Transistor	MATSUSHITA
Q49	2SC1685(R)	Transistor	MATSUSHITA
Q50	2SC1685(R)	Transistor	MATSUSHITA
Q51	–	–	
Q52	2SA564(R)	Transistor	MATSUSHITA
Q53	2SC1685(R)	Transistor	MATSUSHITA
Q54	2SC1685(R)	Transistor	MATSUSHITA
Q55	2SA564(R)	Transistor	MATSUSHITA
Q56	2SC1685(R)	Transistor	MATSUSHITA
Q57	2SC1685(R)	Transistor	MATSUSHITA
Q58	–	–	
Q59	–	–	
Q60	2SC1685(R)	Transistor	MATSUSHITA (PAL only)
Q61	2SC1685(R)	Transistor	MATSUSHITA
Q62	2SC1685(R)	Transistor	MATSUSHITA
Q76	DTC114N	Transistor	ROHM
Q77	2SA564(R)	Transistor	MATSUSHITA

Symbol No.	Part No.	Part Name	Description
D1	HZ15-3L	Zener Diode	HITACHI
D2	MA165	Diode	MATSUSHITA
D3	MA165	Diode	MATSUSHITA
D4	HZ15-3L	Zener Diode	HITACHI
D5	MA165	Diode	MATSUSHITA
D7	HZ15-3L	Zener Diode	HITACHI
D8	MA165	Diode	MATSUSHITA
D9	MA165	Diode	MATSUSHITA
D10	MA165	Diode	MATSUSHITA (PAL only)
D11	MA165	Diode	MATSUSHITA (PAL only)
D12	MA165	Diode	MATSUSHITA (PAL only)
D13	MA165	Diode	MATSUSHITA
D14	HZ15-3L	Zener Diode	HITACHI
D15	MA165	Diode	MATSUSHITA
D16	MA165	Diode	MATSUSHITA
D17	HZ7A3L	Zener Diode	HITACHI
D18	HZ7A3L	Zener Diode	HITACHI
D19	MA165	Diode	MATSUSHITA
D20	MA165	Diode	MATSUSHITA
D21	HZ12C2L	Zener Diode	HITACHI
D22	HZ3A2	Zener Diode	HITACHI
D23	HZ12C2L	Zener Diode	HITACHI
D24	HZ3A2	Zener Diode	HITACHI
D30	MA165	Diode	MATSUSHITA
D31	MA165	Diode	MATSUSHITA
R1	QRD161J-104	CR	100 K 1/6 W
R2	QRD161J-472	CR	4.7 K 1/6 W
R3	QRD161J-473	CR	47 K 1/6 W
R4	QVPB613-203	VR	20 K
R5	QRD161J-273	CR	27 K 1/6 W
R6	QVPB613-103	VR	10 K
R7	QRD161J-822	CR	8.2 K 1/6 W
R8	QRD161J-123	CR	12 K 1/6 W
R9	QRD161J-104	CR	100 K 1/6 W
R10	QRD161J-221	CR	220 K 1/6 W
R11	QRD161J-102	CR	1 K 1/6 W
R12	QRD161J-102	CR	1 K 1/6 W
R13	QRD161J-0R0	CR	0 1/6 W
R14	QVPB613-502	VR	5 K
R15	QRD161J-104	CR	100 K 1/6 W (PAL only)
R16	QRD161J-332	CR	3.3 K 1/6 W (PAL only)
R17	QRD161J-152	CR	1.5 K 1/6 W
R18	QRD161J-102	CR	1 K 1/6 W
R19	QRD161J-272	CR	2.7 K 1/6 W
R20	QRD161J-152	CR	1.5 K 1/6 W
R21	QRD161J-473	CR	47 K 1/6 W
R22	QRD161J-273	CR	27 K 1/6 W
R23	QRD161J-222	CR	2.2 K 1/6 W
R24	QRD161J-331	CR	330 1/6 W
R25	QRD161J-152	CR	1.5 K 1/4 W
R26	QRD161J-101	CR	100 1/6 W
R27	QRD161J-750	CR	75 1/6 W
R28	QRD161J-101	CR	100 1/6 W
R29	–	–	
R30	QRD161J-221	CR	220 1/6 W
R31	QRD161J-332	CR	3.3 K 1/6 W
R32	QRD161J-221	CR	220 1/6 W
R33	QRD161J-123	CR	12 K 1/6 W
R34	QRD161J-562	CR	5.6 K 1/6 W
R35	QRD161J-471	CR	470 1/6 W
R36	QRD161J-392	CR	3.9 K 1/6 W
R37	QRD161J-471	CR	470 1/6 W
R38	QRD161J-392	CR	3.9 K 1/6 W
R39	QRD161J-473	CR	47 K 1/6 W
R40	QRD161J-223	CR	22 K 1/6 W
R41	QRD161J-102	CR	1 K 1/6 W
R42	QRD161J-272	CR	2.7 K 1/6 W
R43	QRD161J-152	CR	1.5 K 1/6 W
R44	QRD161J-472	CR	4.7 K 1/6 W
R45	QRD161J-332	CR	3.3 K 1/6 W
R46	QRD161J-152	CR	1.5 K 1/6 W
R47	QRD161J-473	CR	47 K 1/6 W
R48	QRD161J-273	CR	27 K 1/6 W
R49	QRD161J-222	CR	2.2 K 1/6 W
R50	QRD161J-222	CR	2.2 K 1/6 W
R51	QRD161J-331	CR	330 1/6 W
R52	QRD161J-101	CR	100 1/6 W
R53	QRD161J-152	CR	1.5 K 1/6 W
R54	QRD161J-101	CR	100 1/6 W
R55	QRD161J-750	CR	75 1/6 W
R56	QRD161J-102	CR	1 K 1/6 W
R57	QRD161J-471	CR	470 1/6 W
R58	QRD161J-102	CR	1 K 1/6 W
R59	–	–	
R62	QRD161J-123	CR	12 K 1/6 W
R63	QVPB613-103	VR	10 K
R64	QRD161J-273	CR	27 K 1/6 W
R65	QRD161J-223	CR	22 K 1/6 W
R66	QRD161J-123	CR	12 K 1/6 W
R67	QRD161J-683	CR	68 K 1/6 W
R68	QRD161J-682	CR	6.8 K 1/6 W
R69	QRD161J-222	CR	2.2 K 1/6 W
R70	QRD161J-222	CR	2.2 K 1/6 W
R71	QRD161J-123	CR	12 K 1/6 W
R72	QRD161J-182	CR	1.8 K 1/6 W
R73	QRD161J-183	CR	18 K 1/6 W
R74	QRD161J-223	CR	22 K 1/6 W
R75	QRD161J-102	CR	1 K 1/6 W
R76	QRD161J-102	CR	1 K 1/6 W
R77	QRD161J-105	CR	1 M 1/6 W
R78	QRD161J-223	CR	22 K 1/6 W
R79	QRD161J-123	CR	12 K 1/6 W
R80	QRD161J-182	CR	1.8 K 1/6 W
R81	QRD161J-102	CR	1 K 1/6 W
R82	QRD161J-102	CR	1 K 1/6 W
R83	QRD161J-105	CR	1 M 1/6 W
R84	QRD161J-223	CR	22 K 1/6 W
R85	QRD161J-220	CR	22 1/6 W
R86	QRD161J-220	CR	22 1/6 W
R87	QRD161J-392	CR	3.9 K 1/6 W
R88	QRD161J-100	CR	100 (NTCS only)
R89	QVPB613-102	VR	1 K

Symbol No.	Part No.	Part Name	Description
R90	QVPB613-102	VR	1 K
R91	QVPB613-102	VR	1 K (PAL only)
R92	QRD161J-222	CR	2.2 K 1/6 W
R93	QRD161J-222	CR	2.2 K 1/6 W
R94	QRD161J-102	CR	1 K 1/6 W
R95	QRD161J-392	CR	3.9 K 1/6 W
R96	QRD161J-222	CR	2.2 K 1/6 W
R97	QRD161J-103	CR	10 K 1/6 W
R98	QRD161J-222	CR	2.2 K 1/6 W
R99	QRD161J-102	CR	1 K 1/6 W
R100	QRD161J-102	CR	1 K 1/6 W
R101	QVPB613-202	VR	2 K
R102	QRD161J-102	CR	1 K 1/6 W
R103	QRD161J-221	CR	220 (for NTSC)
	QRD161J-270	CR	27 (for PAL)
R104	QVPB613-101	VR	100
R105	QVPB613-502	VR	5 K
R106	QRD161J-103	CR	10 K (for NTSC)
	QRD161J-472	CR	4.7 K **(for PAL)**
R107	QRD161J-473	CR	47 K 1/6 W
R108	QRD161J-273	CR	27 K 1/6 W
R109	QRD161J-102	CR	1 K 1/6 W
R110	QRD161J-821	CR	820 1/6 W
R111	QRD161J-123	CR	12 K 1/6 W
R112	QRD161J-331	CR	330 1/6 W
R113	QRD161J-152	CR	1.5 K 1/6 W
R114	QRD161J-101	CR	100 1/6 W
R115	QRD161J-101	CR	100 1/6 W
R116	QRD161J-103	CR	10 K 1/6 W
R127	QRD161J-154	CR	150 K 1/6 W
R128	QVPB613-203	VR	20 K
R129	QRD161J-682	CR	6.8 K 1/6 W
R130	QRD161J-103	CR	10 K 1/6 W
R131	QRD161J-154	CR	150 K 1/6 W
R132	QRD161J-154	CR	150 K 1/6 W
R133	QRD161J-472	CR	4.7 K 1/6 W
R134	QRD161J-273	CR	27 K 1/6 W
R135	QRD161J-153	CR	15 K 1/6 W
R136	QRD161J-222	CR	2.2 K 1/6 W
R137	QRD161J-102	CR	1 K 1/6 W
R138	QRD161J-102	CR	1 K 1/6 W
R139	QRD161J-471	CR	470 1/6 W
R140	QRD161J-102	CR	1 K 1/6 W
R141	–	–	
R142	QRD161J-683	CR	68 K 1/6 W
R143	QRD161J-822	CR	8.2 K 1/6 W (PAL only)
R144	QRD161J-0R0	CR	0 1/6 W
R147	QRD161J-123	CR	12 K 1/6 W
R148	QVPB613-103	VR	10 K
R149	QRD161J-273	CR	27 K 1/6 W
R150	QRD161J-223	CR	22 K 1/6 W
R151	QVPB613-103	VR	10 K
R152	QVPB613-103	VR	10 K
R153	QRD161J-222	CR	2.2 K 1/6 W
R154	QRD161J-222	CR	2.2 K 1/6 W
R155	QRD161J-123	CR	12 K 1/6 W
R156	QVPB613-102	VR	1 K
R157	QRD161J-182	CR	1.8 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R158	QRD161J-123	CR	12 K 1/6 W
R159	QRD161J-332	CR	3.3 K 1/6 W
R160	QRD161J-332	CR	3.3 K 1/6 W
R161	QVPB613-103	VR	10 K
R162	QRD161J-332	CR	3.3 K 1/6 W
R163	QVPB613-103	VR	10 K
R164	QRD161J-682	CR	6.8 K 1/6 W
R167	QRD161J-102	CR	1 K 1/6 W
R168	QRD161J-824	CR	820 K (for NTSC)
	QRD161J-682	CR	6.8 K (for PAL)
R169	QRD161J-102	CR	1 K 1/6 W
R170	QRD161J-183	CR	18 K 1/6 W
R171	QRD161J-223	CR	22 K 1/6 W
R172	QRD161J-102	CR	1 K 1/6 W
R173	QRD161J-102	CR	1 K 1/6 W
R174	QRD161J-223	CR	22 K 1/6 W
R175	QRD161J-105	CR	1 M 1/6 W
R176	QRD161J-102	CR	1 K 1/6 W
R177	QRD161J-102	CR	1 K 1/6 W
R178	QRD161J-103	CR	10 K 1/6 W
R179	QRD161J-105	CR	1 M 1/6 W
R180	QRD161J-220	CR	22 1/6 W
R181	QRD161J-220	CR	22 1/6 W
R182	QRD161J-392	CR	3.9 K 1/6 W
R183	QVPB613-102	VR	1 K
R184	QRD161J-222	CR	2.2 K 1/6 W
R185	QVPB613-102	VR	1 K
R186	QRD161J-100	CR	10 (NTSC only)
R187	QRD161J-102	CR	1 K (PAL only)
R188	QRD161J-102	CR	1 K 1/6 W
R189	QRD161J-102	CR	1 K 1/6 W
R190	QRD161J-102	VR	1 K 1/6 W
R191	QRD161J-222	CR	2.2 K 1/6 W
R192	QRD161J-392	CR	3.9 K 1/6 W
R193	QRD161J-222	CR	2.2 K 1/6
R194	QVPB613-102	VR	1 K
R195	QRD161J-102	CR	1 K 1/6 W
R196	QVPB613-502	VR	5 K
R197	QRD161J-102	CR	1 K 1/6 W
R198	QRD161J-222	CR	2.2 K 1/6 W
R199	QRD161J-102	CR	1 K 1/6 W
R200	QRD161J-154	CR	150 K 1/6 W
R201	QRD161J-154	CR	150 K 1/6 W
R202	QRD161J-122	CR	1.2 K 1/6 W
R203	QRD161J-682	CR	6.8 K 1/6 W
R204	QRD161J-103	CR	10 K (PAL only)
R205	QRD161J-392	CR	3.9 K (PAL only)
R206	QRD161J-153	CR	15 K (PAL only)
R207	QRD161J-823	CR	82 K (PAL only)
R208	QRD161J-222	CR	2.2 K 1/6 W
R209	QRD161J-681	CR	680 1/6 W
R210	QRD161J-102	CR	1 K 1/6 W
R211	QRD161J-681	CR	680 1/6 W
R212	QRD161J-273	CR	27 K 1/6 W
R213	QRD161J-153	CR	15 K 1/6 W
R215	QRD161J-681	CR	680 1/6 W
R216	QVPB613-501	VR	500
R217	QRD161J-272	CR	2.7 K 1/6 W
R219	QRD161J-104	CR	100 K (for NTSC)

Symbol No.	Part No.	Part Name	Description
R219	QRD161J-683	CR	68 K (for PAL)
R220	QRD161J-474	CR	470 K 1/6 W (NTSC only)
R221	QRD161J-222	CR	2.2 K 1/6 W
R222	QRD161J-222	CR	2.2 K 1/6 W
R223	–	–	
R224	QRD161J-393	CR	39 K 1/6 W
R225	QRD161J-223	CR	22 K 1/6 W
R226	QRD161J-123	CR	12 K 1/6 W
R228	QRD161J-222	CR	2.2 K 1/6 W
R229	–	–	
R230	QRD161J-683	CR	68 K 1/6 W
R232	QRD161J-333	CR	33 K 1/6 W
R233	QRD161J-182	CR	1.8 K 1/6 W
R234	–	–	
R235	QRD161J-182	CR	1.8 K 1/6 W
R236	QRD161J-471	CR	470 1/6 W
R237	QRD161J-392	CR	3.9 K 1/6 W
R238	QRD161J-471	CR	470 1/6 W
R239	QRD161J-392	CR	3.9 K 1/6 W
R240	QVPB613-201	VR	200
R241	QRD161J-471	CR	470 1/6 W
R242	QVPB613-201	VR	200
R243	QRD161J-473	CR	47 K 1/6 W
R244	QRD161J-393	CR	39 K 1/6 W
R245	QRD161J-471	CR	470 1/6 W
R246	QRD161J-272	CR	2.7 K 1/6 W
R247	–	–	
R248	–	–	
R249	–	–	
R250	–	–	
R251	–	–	
R252	–	–	
R253	–	–	
R254	QRD161J-392	CR	3.9 K (PAL only)
R255	QRD161J-223	CR	22 K (PAL only)
R256	QRD161J-223	CR	22 K (PAL only)
R257	QRD161J-103	CR	10 K (PAL only)
R258	QRD161J-123	CR	12 K (PAL only)
R259	QRD161J-561 QRD161J-221	CR CR	560 (for NTSC) 220 (for PAL)
R260	QVPB613-501	VR	500
R261	QRD161J-102	CR	1 K 1/6 W
R262	QRD161J-273	CR	27 K 1/6 W
R263	QRD161J-273	CR	27 K 1/6 W
R278	QRD161J-222	CR	2.2 K 1/6 W
R279	QRD161J-272	CR	2.7 K 1/6 W
R280	QRD161J-123	CR	12 K 1/6 W
R281	QRD161J-393	CR	39 K 1/6 W
R282	QRD161J-223	CR	22 K 1/6 W
R283	QVPB613-502	VR	5 K
R284	QRD161J-103 QRD161J-223	CR CR	10 K (for NTSC) 22 K (for PAL)
R299	QRD161J-103	CR	10 K 1/6 W
R300	QRD161J-470	CR	47 1/6 W
R301	QRD161J-470	CR	47 1/6 W
R302	QRD161J-682	CR	6.8 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R303	QRD161J-103	CR	10 K 1/6 W
R304	QRD161J-103	CR	10 K 1/6 W
R305	QRD161J-103	CR	10 K 1/6 W
R306	QRD161J-103	CR	10 K 1/6 W
R307	QRD161J-562	CR	5.6 K 1/6 W
R308	QRD161J-153	CR	15 K 1/6 W
R309	QRD161J-472	CR	4.7 K 1/6 W
R310	QRD161J-103	CR	10 K 1/6 W
R311	QRD161J-103	CR	10 K 1/6 W
R312	QRD161J-103	CR	10 K 1/6 W
R313	QRD161J-103	CR	10 K 1/6 W
R314	QRD161J-562	CR	5.6 K 1/6 W
R315	QRD161J-103	CR	10 K 1/6 W
R316	QRD161J-104	CR	100 K 1/6 W
R317	–	–	
R318	QRD161J-332	CR	3.3 K 1/6 W
R319	QVPB613-102	VR	1 K
R320	QRD161J-272	CR	2.7 K 1/6 W
R321	QRD161J-393	CR	39 K 1/6 W
R322	QRD161J-102	CR	1 K 1/6 W
R323	–	–	
R324	QRD161J-223	CR	22 K 1/6 W
R325	QRD161J-103	CR	10 K 1/6 W
R326	QRD161J-103	CR	10 K 1/6 W
R327	QVPB613-203	VR	20 K
R328	QRD161J-472	CR	4.7 K 1/6 W
R329	QRD161J-123	CR	12 K 1/6 W
R330	QRD161J-123	CR	12 K 1/6 W
R331	QRD161J-102	CR	1 K 1/6 W
R332	QRD161J-104	CR	100 K 1/6 W
R333	–	–	
R334	QRD161J-332	CR	3.3 K 1/6 W
R335	QVPB613-102	VR	1 K
R336	QRD161J-272	CR	2.7 K 1/6 W
R337	QRD161J-273	CR	27 K 1/6 W
R338	QRD161J-102	CR	1 K 1/6 W
R339	–	–	
R340	QRD161J-393	CR	39 K 1/6 W
R341	QRD161J-103	CR	10 K 1/6 W
R342	QRD161J-103	CR	10 K 1/6 W
R343	QVPB613-203	VR	20 K
R344	QRD161J-472	CR	4.7 K 1/6 W
R345	QRD161J-123	CR	12 K 1/6 W
R346	QRD161J-123	CR	12 K 1/6 W
R347	QRD161J-102	CR	1 K 1/6 W
R348	QRD161J-331	CR	330 1/6 W
R349	QRD161J-331	CR	330 1/6 W
R350	QRD161J-103	CR	10 K 1/6 W
R351	QRD161J-103	CR	10 K 1/6 W
R352	QRD161J-472	CR	4.7 K 1/6 W
R353	QRD161J-103	CR	10 K 1/6 W
R354	QRD161J-821	CR	8.2 K 1/6 W
R355	QRD161J-472	CR	4.7 K 1/6 W
R356	QRD161J-392	CR	3.9 K 1/6 W
R357	QRD161J-562	CR	5.6 K 1/6 W
R358	QRD161J-750	CR	75 1/6 W
R359	QRD161J-473	CR	47 K 1/6 W
R360	QRD161J-393	CR	39 K 1/6 W
R361	QRD161J-123	CR	12 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R362	QRD161J-183	CR	18 K 1/6 W
R363	QRD161J-222	CR	2.2 K 1/6 W
R364	QRD161J-272	CR	2.7 K 1/6 W
R365	QRD161J-123	CR	12 K 1/6 W
R366	QRD161J-153	CR	15 K 1/6 W
R367	QRD161J-221	CR	220 1/6 W
R368	QRD161J-222	CR	2.2 K 1/6 W
R400	QRD161J-222	CR	2.2 K 1/6 W
R401	QRD161J-222	CR	2.2 K 1/6 W
R402	QRD161J-222	CR	2.2 K 1/6 W
R403	QRD161J-392	CR	3.9 K 1/6 W
R407	QRD161J-153	CR	15 K 1/6 W
R408	QRD161J-392	CR	3.9 K 1/6 W
R409	QRD161J-474	CR	470 K 1/6 W
R410	QRD161J-392	CR	3.9 K 1/6 W
R411	QRD161J-474	CR	470 K 1/6 W
C1	QETA1EM-476	E Cap	47 25 V
C2	QCS11HJ-271	C Cap	270 P 50 V
C3	QCS11HJ-151	C Cap	150 P 50 V
C4	QCS11HJ-390	C Cap	39 P 50 V
C5	QETA1CM-106	E Cap	10 16 V
C6	QETA1CM-106	E Cap	10 16 V
C7	QETA1EM-476	E Cap	47 25 V
C8	QETA1EM-476	E Cap	47 25 V
C9	QETA1CM-476	E Cap	47 16 V
C10	QETA1EM-476	E Cap	47 25 V
C11	QETA1CM-107	E Cap	100 16 V
C12	QETA1CM-476	E Cap	47 16 V
C13	QETA1CM-107	E Cap	100 16 V
C14	QEPA1CM-106	NP Cap	10 16 V
C15	QETA1CM-106	E Cap	10 16 V
C16	QETA1CM-106	E Cap	10 16 V
C17	QETA1EM-476	E Cap	47 25 V
C18	QETA1EM-476	E Cap	47 25 V
C19	QETA1EM-476	E Cap	47 25 V
C20	QETA1EM-476	E Cap	47 25 V
C21	QETA1EM-476	E Cap	47 25 V
C22	QFN41HJ-103	MY Cap	0.01 50 V
C23	QCZ0206-104	C Cap	0.1
C24	QETA1CM-476	E Cap	47 16 V
C25	QETA1CM-476	E Cap	47 16 V
C26	QETA1EM-476	E Cap	47 25 V
C27	QFN41HJ-102	MY Cap	1000 P 50 V
C28	QFN41HJ-102	MY Cap	1000 P 50 V
C29	QETA1CM-106	E Cap	10 16 V
C30	QER41HM-105	E Cap	1 50 V
C31	QCZ0206-104	C Cap	0.1
C32	QCZ0206-104	C Cap	0.1
C33	QCZ0206-104	C Cap	0.1
C34	QCS11HJ-560	C Cap	56 P (for NTSC)
	QCS11HJ-390	C Cap	39 P (for PAL)
C35	QCS11HJ-101	C Cap	100 P (for NTSC)
	QCS11HJ-330	C Cap	33 P (for PAL)
C36	QCS11HJ-101	C Cap	100 P (for NTSC)
	QCS11HJ-180	C Cap	18 P (for PAL)

Symbol No.	Part No.	Part Name	Description
C37	QCS11HJ-151	C Cap	150 P (for NTSC)
	QCS11HJ-121	C Cap	120 P (for PAL)
C38	QCZ0206-104	C Cap	0.1
C39	QCZ0206-104	C Cap	0.1
C40	QCZ0206-104	C Cap	0.1
C41	QCZ0206-104	C Cap	0.1
C42	QER41HM-105	E Cap	1 50 V
C43	QETA1CM-476	E Cap	47 16 V
C44	QCZ0206-104	C Cap	0.1
C45	QCZ0206-104	C Cap	0.1
C46	QCZ0206-104	C Cap	0.1
C47	QCZ0206-104	C Cap	0.1
C48	QCZ0206-104	C Cap	0.1 (PAL only)
C49	QCZ0206-104	C Cap	0.1 (PAL only)
C50	QCS11HJ-101	C Cap	100 P 50 V
C51	QCZ0206-104	C Cap	0.1
C52	QCS11HJ-390	C Cap	39 P 50 V
C53	QEPA1CM-106	E Cap	1 16 V
C54	QETA1CM-476	E Cap	47 16 V
C55	QETA1CM-476	E Cap	47 16 V
C56	QCZ0206-104	C Cap	0.1
C59	QETA1CM-476	E Cap	47 16 V
C60	QETA1EM-476	E Cap	47 25 V
C61	QETA1EM-476	E Cap	47 25 V
C62	QETA1EM-476	E Cap	47 25 V
C63	QFN41HJ-102	MY Cap	1000 P 50 V
C64	QFN41HJ-102	MY Cap	1000 P 50 V
C65	QFN41HJ-102	MY Cap	1000 P 50 V
C66	QETA1EM-476	E Cap	47 25 V
C68	QFN41HJ-103	MY Cap	0.01 50 V
C69	QCZ0206-104	C Cap	0.1
C70	QETA1CM-476	E Cap	47 16 V
C72	QFN41HJ-102	MY Cap	1000 P 50 V
C73	QFN41HJ-102	MY Cap	1000 P 50 V
C74	QETA1EM-476	E Cap	47 25 V
C75	QCS11HJ-330	C Cap	33 P 50 V
C76	QETA1CM-476	E Cap	47 16 V
C77	QFN41HJ-104	MY Cap	0.1 50 V
C78	QCZ0206-104	C Cap	0.1 (for NTSC)
	QEPA1CM-106	NP Cap	10 **(for PAL)**
C79	QCZ0206-104	C Cap	0.1
C80	QCZ0206-104	C Cap	0.1
C81	QFN41HJ-104	MY Cap	0.1 50 V (for NTSC)
	QCZ0206-104	C Cap	0.1 **(for PAL)**
C82	QETA1CM-476	E Cap	47 16 V
C83	QCZ0206-104	C Cap	0.1
C84	QCZ0206-104	C Cap	0.1
C85	QCZ0206-104	C Cap	0.1
C86	QCZ0206-104	C Cap	0.1
C87	QETA1CM-476	E Cap	47 16 V
C88	QETA1EM-476	E Cap	47 25 V
C89	QCS11HJ-560	C Cap	56 P (for NTSC)
	QCS11HJ-390	C Cap	39 P (for PAL)
C90	QCS11HJ-101	C Cap	100 P (for NTSC)
	QCS11HJ-330	C Cap	33 P (for PAL)
C91	QCS11HJ-101	C Cap	100 P (for NTSC)
	QCS11HJ-180	C Cap	18 P (for PAL)
C92	QCS11HJ-151	C Cap	150 P (for NTSC)
	QCS11HJ-121	C Cap	120 P (for PAL)

Symbol No.	Part No.	Part Name	Description
C93	QETA1HM-105	E Cap	1 50 V
C94	QCZ0206-104	C Cap	0.1
C95	QCZ0206-104	C Cap	0.1
C96	QEPA1CM-106	NP Cap	10 16 V
C97	QCS11HJ-390	C Cap	39 P 50 V (for NTSC)
	QCS11HJ-121	C Cap	120 P 50 V (for PAL)
C98	QETA1EM-106	E Cap	10 25 V
C99	QCZ0206-104	C Cap	
C101	QETA1EM-476	E Cap	47 25 V
C102	QETA1EM-476	E Cap	47 25 V
C103	QCS11HJ-150	C Cap	15 P 50 V
C104	QCZ0206-104	C Cap	0.1
C105	QETA1EM-476	E Cap	47 25 V
C106	QCS11HJ-180	C Cap	18 P 50 V
C107	QETA1EM-106	E Cap	10 25 V
C108	QCS11HJ-470	C Cap	47 P 50 V
C109	QCS11HJ-180	C Cap	18 P 50 V
C110	QCS11HJ-470	C Cap	47 P 50 V
C111	QETA1EM-106	E Cap	10 25 V
C112	QETA1EM-476	E Cap	47 25 V
C113	QETA1EM-476	E Cap	47 25 V
C114	QETA1EM-476	E Cap	47 25 V
C115	QEPA1HM-105	E Cap	1 50 V
C116	QEPA1HM-105	E Cap	1 50 V
C117	QETA1EM-476	E Cap	47 25 V
C118	QETA1EM-476	E Cap	47 25 V
C119	QETA1EM-476	E Cap	47 25 V
C120	QCS11HJ-121	C Cap	120 P (PAL only)
C121	QETA1EM-476	E Cap	47 25 V
C122	QCZ0206-104	C Cap	0.1 (PAL only)
C123	QCZ0206-104	C Cap	0.1 (PAL only)
C124	QCZ0206-104	C Cap	0.1 (PAL only)
C125	QCS11HJ-151	C Cap	150 P (for NTSC)
	QCS11HJ-121	C Cap	120 P (for PAL)
C126	QCZ0206-104	C Cap	0.1 (NTSC only)
C127	QCZ0206-104	C Cap	0.1
C128	QETA1EM-476	E Cap	47 25 V
C134	QETA1EM-106	E Cap	10 25 V
C136	QEPA1CM-106	NP Cap	10 16 V
C140	QFN41HJ-103	MY Cap	0.01 50 V
C141	QFN41HJ-472	MY Cap	4700 P 50 V
C142	QFN41HJ-103	MY Cap	0.01 50 V
C143	QETA1CM-106	E Cap	10 16 V
C144	QCF11HP-103	C Cap	0.01 50 V
C145	QCF11HP-103	C Cap	0.01 50 V
C146	QCF11HP-103	C Cap	0.01 50 V
C147	QCF11HP-103	C Cap	0.01 50 V
C148	QETA1EM-476	E Cap	47 25 V
C150	QCF11HP-103	C Cap	0.01 50 V
C151	QCF11HP-103	C Cap	0.01 50 V
C152	QCF11HP-103	C Cap	0.01 50 V
C153	QCF11HP-103	C Cap	0.01 50 V
C154	QCF11HP-103	C Cap	0.01 50 V
C155	QCF11HP-103	C Cap	0.01 50 V
C156	QCF11HP-103	C Cap	0.01 50 V
C157	QCF11HP-103	C Cap	0.01 50 V
C158	QCF11HP-103	C Cap	0.01 50 V
C159	QCF11HP-103	C Cap	0.01 50 V
C160	QCF11HP-103	C Cap	0.01 50 V

Symbol No.	Part No.	Part Name	Description
C161	QCF11HP-103	C Cap	0.01 50 V
C162	QCF11HP-103	C Cap	0.01 50 V
C163	QCF11HP-103	C Cap	0.01 50 V
C164	QCF11HP-103	C Cap	0.01 50 V
C165	QCF11HP-103	C Cap	0.01 50 V
C166	QCF11HP-103	C Cap	0.01 50 V
C167	QCF11HP-103	C Cap	0.01 50 V
C168	QCF11HP-103	C Cap	0.01 50 V
C169	QCF11HP-103	C Cap	0.01 50 V
C170	QCF11HP-103	C Cap	0.01 50 V
C171	QCF11HP-103	C Cap	0.01 50 V
C172	QCF11HP-103	C Cap	0.01 50 V
C173	QCF11HP-103	C Cap	0.01 50 V
C174	QCF11HP-103	C Cap	0.01 50 V
C175	QCF11HP-103	C Cap	0.01 50 V
C176	QCF11HP-103	C Cap	0.01 50 V
C177	QCF11HP-103	C Cap	0.01 50 V
C178	QCF11HP-103	C Cap	0.01 50 V
C179	QCF11HP-103	C Cap	0.01 50 V
C180	QCF11HP-103	C Cap	0.01 50 V
C181	QCF11HP-103	C Cap	0.01 50 V
C182	QCF11HP-103	C Cap	0.01 50 V
C183	QCF11HP-103	C Cap	0.01 50 V
C184	QCF11HP-103	C Cap	0.01 50 V
C185	QCF11HP-103	C Cap	0.01 50 V
C186	QCF11HP-103	C Cap	0.01 50 V
C187	QCF11HP-103	C Cap	0.01 50 V
C188	QCF11HP-103	C Cap	0.01 50 V
C189	QCF11HP-103	C Cap	0.01 50 V
C190	QCF11HP-103	C Cap	0.01 50 V
C191	QCF11HP-103	C Cap	0.01 50 V
C192	QCF11HP-103	C Cap	0.01 50 V
C193	QCF11HP-103	C Cap	0.01 50 V
C194	QCF11HP-103	C Cap	0.01 50 V
C195	QCF11HP-103	C Cap	0.01 50 V
C196	QCF11HP-103	C Cap	0.01 50 V
C197	QCF11HP-103	C Cap	0.01 50 V
C198	QCF11HP-103	C Cap	0.01 50 V
C199	QCF11HP-103	C Cap	0.01 50 V
C200	QCF11HP-103	C Cap	0.01 50 V
C201	QCF11HP-103	C Cap	0.01 50 V
C202	QCF11HP-103	C Cap	0.01 50 V
C203	QCF11HP-103	C Cap	0.01 50 V
C204	QCF11HP-103	C Cap	0.01 50 V
C205	QCF11HP-103	C Cap	0.01 50 V
C206	QETA1HM-105	E Cap	1 50 V
C207	QETA1HM-105	E Cap	1 50 V
C208	QEPA1HM-105	NP Cap	1 50 V
C209	QETA1HM-105	E Cap	1 50 V
C210	QETA1HM-105	E Cap	1 50 V
C211	QEPA1HM-105	NP Cap	1 50 V
C212	QCS11HJ-471	C Cap	470 P 50 V
C214	QETA1CM-476	E Cap	47 16 V
C215	QETA1CM-476	E Cap	47 16 V
C216	–	–	
C217	QETA1CM-106	E Cap	10 16 V
C300	QCS11HK-100	C Cap	10 P 50 V
C301	QETA1CM-476	E Cap	47 16 V

Symbol No.	Part No.	Part Name	Description
RA1	RKM10L103G	R NETWORK	10 K x 10
RA2	RKM10L103G	R NETWORK	10 K x 10
L1	SCV0331-100	Peaking Coil	10 μ
L2	SCV0331-220	Peaking Coil	22 μ (for NTSC)
	SCV0331-390	Peaking Coil	39 μ (for PAL)
L4	SCV0331-100	Peaking Coil	10 μ
L5	SCV0331-220	Peaking Coil	22 μ (for NTSC)
	SCV0331-390	Peaking Coil	39 μ (for PAL)
L7	SCV0331-220	Peaking Coil	22 μ
J1	QRD161J-0R0	CR	0 1/6 W (NTSC only)
J2	QRD161J-0R0	CR	0 1/6 W (NTSC only)
J3	QRD161J-0R0	CR	0 1/6 W (PAL only)
CN4	SCV1197-090	Connector	90 Pin
CBM1	**CBMC3436-00A**	**DL-25 CBM**	
C1	NCT03UJ-330	C Cap	33 P
C2	NCT03UJ-680	C Cap	68 P
C3	NCT03UJ-680	C Cap	68 P
C4	NCT03UJ-680	C Cap	68 P
C5	NCT03UJ-680	C Cap	68 P
C6	NCT03UJ-680	C Cap	68 P
C7	NCT03UJ-680	C Cap	68 P
C8	NCT03UJ-680	C Cap	68 P
C9	NCT03UJ-330	C Cap	33 P
L1	SCV1488-120	Peaking Coil	12 μ
L2	SCV1488-120	Peaking Coil	12 μ
L3	SCV1488-120	Peaking Coil	12 μ
L4	SCV1488-120	Peaking Coil	12 μ
L5	SCV1488-120	Peaking Coil	12 μ
L6	SCV1488-120	Peaking Coil	12 μ
L7	SCV1488-120	Peaking Coil	12 μ
L8	SCV1488-120	Peaking Coil	12 μ
CBM3	**CBMC3436-00B**	**DL-30 CBM**	
C1	NCT03UJ-330	C Cap	33 P
C2	NCT03UJ-680	C Cap	68 P
C3	NCT03UJ-680	C Cap	68 P
C4	NCT03UJ-680	C Cap	68 P
C5	NCT03UJ-680	C Cap	68 P
C6	NCT03UJ-680	C Cap	68 P

Symbol No.	Part No.	Part Name	Description
C7	NCT03UJ-680	C Cap	68 P
C8	NCT03UJ-680	C Cap	68 P
C10	NCT03UJ-680	C Cap	68 P
C11	NCT03UJ-330	C Cap	33 P
L1 -L10	SCV1488-120	Peaking Coil	12 μ
	CBMC4458-00A	**B.B AMP CBM**	
Q1	2SC2814(F4.5)	Transister	SANYO
Q2	2SC2814(F4.5)	Transister	SANYO
Q3	2SC2814(F4.5)	Transister	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
C2	NCF21EZ-104	C Cap	0.1 25 V
	● DS board assembly (Not available on the -003 BC board and after.)		
Q70	2SC1685(R.S)	Transister	MATSUSHITA
Q71	2SC1685(R.S)	Transister	MATSUSHITA
Q72	2SA564(R)	Transister	MATSUSHITA
Q73	2SC1685(R.S)	Transister	MATSUSHITA
Q74	2SA564(R)	Transister	MATSUSHITA
Q75	2SC1685(R.S)	Transister	MATSUSHITA
R323	QRD161J-102	CR	1 K 1/6 W
R339	QRD161J-102	CR	1 K 1/6 W
R380	QRD161J-473	CR	47 K 1/6 W
R381	QRD161J-393	CR	39 K 1/6 W
R382	QRD161J-102	CR	1 K 1/6 W
R383	QRD161J-102	CR	1 K 1/6 W
R384	QVPB614-202	VR	2 K
R385	QRD161J-152	CR	1.5 K 1/6 W
R386	QRD161J-472	CR	4.7 K 1/6 W
R387	QRD161J-472	CR	4.7 K 1/6 W
C230	QER41CM-476	E Cap	47 16 V
C231	QCF11HP-103	C Cap	0.01 50 V

6.7 KSG (NTSC)/(PAL) board assembly 07

07□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	TC4053BP	IC	TOSHIBA
IC2	TC4069UBP	IC	TOSHIBA
IC3	TC4053BP	IC	TOSHIBA
IC4	TC4053BP	IC	TOSHIBA
IC5	TC4053BP	IC	TOSHIBA
IC6	TC4069UBP	IC	TOSHIBA
IC7	TC4069UBP	IC	TOSHIBA
IC8	–	–	
IC9	–	–	
IC10	–	–	
IC11	HD75189P	IC	HITACHI
IC12	HD75188P	IC	HITACHI
IC13	HD75188P	IC	HITACHI
IC14	TC4013BAP	IC	TOSHIBA
IC15	TC40H004P	IC	TOSHIBA
IC16	TC4025BP	IC	TOSHIBA
IC17	TC4071BP	IC	TOSHIBA
IC18	TC4515BP	IC	TOSHIBA
IC19	TC4024BP	IC	TOSHIBA
IC20	TC4081BP	IC	TOSHIBA
IC21	TC4013BAP	IC	TOSHIBA
IC22	TC4013BAP	IC	TOSHIBA
IC30	TC4013BAP	IC	TOSHIBA
IC31	NJM7809A	IC	JRC
Q1	2SC1685(R)	Transistor	MATSUSHITA
Q2	2SA564(R)	Transistor	MATSUSHITA
Q3	2SC1685(R)	Transistor	MATSUSHITA
Q4	2SC1685(R)	Transistor	MATSUSHITA
Q5	2SA564(R)	Transistor	MATSUSHITA
Q6	2SC1685(R)	Transistor	MATSUSHITA
Q7	2SC1685(R)	Transistor	MATSUSHITA
Q8	2SA564(R)	Transistor	MATSUSHITA
Q9	2SA564(R)	Transistor	MATSUSHITA
Q10	2SC1685(R)	Transistor	MATSUSHITA
Q11	2SA564(R)	Transistor	MATSUSHITA
Q12	2SC1685(R)	Transistor	MATSUSHITA
Q13	2SA564(R)	Transistor	MATSUSHITA
Q14	2SC1685(R)	Transistor	MATSUSHITA
Q15	2SA564(R)	Transistor	MATSUSHITA
Q16	2SC1685(R)	Transistor	MATSUSHITA (PAL only)
Q17	2SC1685(R)	Transistor	MATSUSHITA
Q18	2SC1685(R)	Transistor	MATSUSHITA
Q19	2SA564(R)	Transistor	MATSUSHITA
D1	HZ15-3L	Zener Diode	HITACHI
D2	HZ15-3L	Zener Diode	HITACHI
D3	HZ15-3L	Zener Diode	HITACHI
D4	HZ15-3L	Zener Diode	HITACHI
D5	HZ15-3L	Zener Diode	HITACHI
D6	HZ15-3L	Zener Diode	HITACHI
D7	HZ15-3L	Zener Diode	HITACHI

Symbol No.	Part No.	Part Name	Description
D8	HZ15-3L	Zener Diode	HITACHI
D9	HZ15-3L	Zener Diode	HITACHI
D10	–	–	
D11	MA165	Diode	MATSUSHITA
R1	QRD161J-750	CR	75 1/6 W
R2	QRD161J-473	CR	47 K 1/6 W
R3	QRD161J-473	CR	47 K 1/6 W
R4	QRD161J-331	CR	330 1/6 W
R5	QRD161J-152	CR	1.5 K 1/6 W
R6	QRD161J-473	CR	47 K 1/6 W
R7	QRD161J-474	CR	470 K 1/6 W
R8	QRD161J-152	CR	1.5 K 1/6 W
R9	QRD161J-222	CR	2.2 K 1/6 W
R10	QRD161J-222	CR	2.2 K 1/6 W
R11	QRD161J-222	CR	2.2 K 1/6 W
R12	QRD161J-750	CR	75 1/6 W
R13	QRD161J-473	CR	47 K 1/6 W
R14	QRD161J-473	CR	47 K 1/6 W
R15	QRD161J-331	CR	330 1/6 W
R16	QRD161J-152	CR	1.5 K 1/6 W
R17	QRD161J-473	CR	47 K 1/6 W
R18	QRD161J-474	CR	470 K 1/6 W
R19	QRD161J-152	CR	1.5 K 1/6 W
R20	QRD161J-222	CR	2.2 K 1/6 W
R21	QRD161J-222	CR	2.2 K 1/6 W
R22	QRD161J-472	CR	4.7 K 1/6 W
R23	QRD161J-750	CR	75 1/6 W
R24	QRD161J-473	CR	47 K 1/6 W
R25	QRD161J-473	CR	47 K 1/6 W
R26	QRD161J-331	CR	330 1/6 W
R27	QRD161J-152	CR	1.5 K 1/6 W
R28	QRD161J-473	CR	47 K 1/6 W
R29	QRD161J-473	CR	47 K 1/6 W
R30	QRD161J-152	CR	1.5 K 1/6 W
R31	QRD161J-473	CR	47 K 1/6 W
R32	QRD161J-474	CR	470 K 1/6 W
R33	QRD161J-152	CR	1.5 K 1/6 W
R34	QRD161J-750	CR	75 1/6 W
R35	QRD161J-473	CR	47 K 1/6 W
R36	QRD161J-473	CR	47 K 1/6 W
R37	QRD161J-331	CR	330 1/6 W
R38	QRD161J-152	CR	1.5 K 1/6 W
R39	QRD161J-473	CR	47 K 1/6 W
R40	QRD161J-474	CR	470 K 1/6 W
R41	QRD161J-152	CR	1.5 K 1/6 W
R42	QRD161J-750	CR	75 1/6 W
R43	QRD161J-473	CR	47 K 1/6 W
R44	QRD161J-473	CR	47 K 1/6 W
R45	QRD161J-331	CR	330 1/6 W
R46	QRD161J-152	CR	1.5 K 1/6 W
R47	QRD161J-473	CR	47 K 1/6 W
R48	QRD161J-474	CR	470 K 1/6 W
R49	QRD161J-104	CR	100 K 1/6 W
R50	QRD161J-152	CR	1.5 K 1/6 W

Symbol No.	Part No.	Part Name	Description
R51	QRD161J-750	CR	75 1/6 W
R52	QRD161J-473	CR	47 K 1/6 W
R53	QRD161J-473	CR	47 K 1/6 W
R54	QRD161J-331	CR	330 1/6 W
R55	QRD161J-152	CR	1.5 K 1/6 W
R56	QRD161J-473	CR	47 K 1/6 W
R57	QRD161J-474	CR	470 K 1/6 W
R58	QRD161J-152	CR	1.5 K 1/6 W
R59	–	–	
R60	–	–	
R61	QRD161J-224	CR	220 K (PAL only)
R62	QRD161J-684	CR	680 K (PAL only)
R63	QRD161J-332	CR	3.3 K (PAL only)
R64	QRD161J-392	CR	3.9 K (PAL only)
R65	QRD161J-332	CR	3.3 K (PAL only)
R66	QRD161J-102	CR	1 K (PAL only)
R67	QVPB613-202	VR	2 K (PAL only)
R68	QRD161J-472	CR	4.7 K (PAL only)
R69	QRD161J-473	CR	47 K 1/6 W
R70	QRD161J-750	CR	75 1/6 W
R71	QRD161J-473	CR	47 K 1/6 W
R72	QRD161J-473	CR	47 K 1/6 W
R73	QRD161J-222	CR	2.2 K 1/6 W
R74	QVPB613-202	VR	2 K
R75	QRD161J-104	CR	100 K 1/6 W
R76	QRD161J-104	CR	100 K 1/6 W
R77	QRD161J-101	CR	100 1/6 W
R78	QRD161J-103	CR	10 K 1/6 W
R79	QRD161J-682	CR	6.8 K 1/6 W
R80	QRD161J-222	CR	2.2 K 1/6 W
R81	QVPB613-103	VR	10 K
R82	QRD161J-473	CR	47 K 1/6 W
R83	QRD161J-103	CR	10 K 1/6 W
R84	QVPB702-202	VR	2 K
R85	QVPB702-103	VR	10 K
R86	QRD161J-222	CR	2.2 K 1/6 W
R100	QRD161J-562	CR	5.6 K 1/6 W
R101	QRD161J-220	CR	22 1/6 W
R102	QRD161J-272	CR	2.7 K 1/6 W
R103	QRD161J-272	CR	2.7 K 1/6 W
R104	QRD161J-471	CR	470 1/6 W
R105	QRD161J-473	CR	47 K 1/6 W
R106	QRD161J-102	CR	1.0 K 1/6 W
C1	QETA1EM-107	E Cap	100 25 V
C2	QETA1EM-107	E Cap	100 25 V
C3	QETA1EM-107	E Cap	100 25 V
C4	QETA1EM-107	E Cap	100 25 V
C5	QETA1EM-107	E Cap	100 25 V
C6	QETA1EM-107	E Cap	100 25 V
C7	QETA1EM-107	E Cap	100 25 V
C8	QETA1CM-106	E Cap	10 16 V
C9	QETA1CM-106	E Cap	10 16 V
C10	QCS11HJ-270	C Cap	27 P 50 V
C11	QCS11HJ-180	C Cap	18 P 50 V

Symbol No.	Part No.	Part Name	Description
C12	QETA1EM-107	E Cap	100 25 V
C13	QETA1EM-107	E Cap	100 25 V
C14	QETA1EM-107	E Cap	100 25 V
C15	QETA1CM-106	E Cap	10 16 V
C16	QETA1CM-106	E Cap	10 16 V
C17	QCS11HJ-270	C Cap	27 P 50 V
C18	QCS11HJ-180	C Cap	18 P 50 V
C19	QETA1EM-107	E Cap	100 25 V
C20	QETA1EM-107	E Cap	100 25 V
C21	QETA1CM-106	E Cap	10 16 V
C22	QETA1CM-106	E Cap	10 16 V
C23	QETA1EM-107	E Cap	100 25 V
C24	QETA1CM-106	E Cap	10 16 V
C25	QETA1EM-107	E Cap	100 25 V
C26	QETA1EM-107	E Cap	100 25 V
C27	QETA1CM-106	E Cap	10 16 V
C28	QETA1CM-106	E Cap	10 16 V
C29	QETA1EM-107	E Cap	100 25 V
C30	QETA1CM-106	E Cap	10 16 V
C31	QETA1CM-106	E Cap	10 16 V
C32	QETA1EM-107	E Cap	100 25 V
C33	QETA1EM-107	E Cap	100 25 V
C34	QETA1CM-106	E Cap	10 16 V
C35	QETA1CM-106	E Cap	10 16 V
C36	QETA1EM-107	E Cap	100 25 V
C37	QETA1EM-107	E Cap	100 25 V
C38	QFN41HJ-103	MY Cap	0.01 (PALonly)
C39	QFN41HJ-103	MY Cap	0.01 (PALonly)
C40	QFN41HJ-103	MY Cap	0.01 (PALonly)
C41	QCS11HJ-101	C Cap	100 P 50 V
C42	QCS11HJ-101	C Cap	100 P 50 V
C43	QRD161J-0R0	CR	0 1/6 W
C44	QCS11HJ-221	C Cap	220 P 50 V
C45	QFN41HJ-472	MY Cap	4700 P 50 V
C46	QETA1EM-107	E Cap	100 25 V
C47	QETA1EM-107	E Cap	100 25 V
C48	QETA1EM-107	E Cap	100 25 V
C49	QETA1EM-107	E Cap	100 25 V
C50	QETA1EM-107	E Cap	100 25 V
C51	QETA1EM-107	E Cap	100 25 V
C52	QETA1EM-107	E Cap	100 25 V
C53	QETA1EM-107	E Cap	100 25 V
C54	QETA1EM-107	E Cap	100 25 V
C55	QETA1EM-107	E Cap	100 25 V
C56	QETA1EM-107	E Cap	100 25 V
C57	QCF11HP-103	C Cap	0.01 50 V
C58	QCF11HP-103	C Cap	0.01 50 V
C59	QCF11HP-103	C Cap	0.01 50 V
C60	QCF11HP-103	C Cap	0.01 50 V
C61	QCF11HP-103	C Cap	0.01 50 V
C62	QCF11HP-103	C Cap	0.01 50 V
C62	QCF11HP-103	C Cap	0.01 50 V
C64	QCF11HP-103	C Cap	0.01 50 V
C65	QCF11HP-103	C Cap	0.01 50 V
C66	QCF11HP-103	C Cap	0.01 50 V
C67	QCF11HP-103	C Cap	0.01 50 V
C68	QCF11HP-103	C Cap	0.01 50 V
C69	QCF11HP-103	C Cap	0.01 50 V
C70	QCF11HP-103	C Cap	0.01 50 V

Symbol No.	Part No.	Part Name	Description
C71	QCS11HJ-150	C Cap	15 P 50 V
C100	QETA1CM-227	E Cap	220 16 V
C101	QFN41HJ-102	MY Cap	1000 P 50 V
S1	QSS6201-002	Slide Switch	
S2	QSS6201-002	Slide Switch	
S3	SCV1549-001	Toggle Switch	
CN5	SCV1197-090	Connector	90 Pin
CN2	SCV1468-020	Connector	20 Pin
CBM1 – CBM9	**CBMC4374-00A**	**PULSE CBM**	
Q1	2SA1179(M5.6)	Transistor	SANYO
Q2	2SA1179(M5.6)	Transistor	SANYO
Q3	2SA1179(M5.6)	Transistor	SANYO
Q4	2SA1179(M5.6)	Transistor	SANYO
C1	NCF21EZ-104	C Cap	0.1 25 V
CBM10	**CBMC4355-00A**	**VIDEO CBM**	
Q1	2SC2814(F4.5)	Transistor	SANYO
Q2	2SC2814(F4.5)	Transistor	SANYO
Q3	2SC2814(F4.5)	Transistor	SANYO
C1	NCF21HZ-473	C Cap	0.047 50 V
C2	NCF21HZ-473	C Cap	0.047 50 V

6.8 SG unit board assembly (NTSC version) 07

07□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	SCV0322-002	IC (M)	JVC
IC2	–	–	
IC3	SCV0486-001	Function Module (H)	JVC
IC4	HA11244	IC (M)	HITACHI
IC5	UPD74HC00C	IC	NEC
IC6	TC40H004P	IC (M)	TOSHIBA
IC7	TC40H000P	IC (M)	TOSHIBA
IC8	TC40H000P	IC (M)	TOSHIBA
IC9	TC4528BP	IC (M)	TOSHIBA
IC10	TC4053BF	IC (M)	TOSHIBA
IC11	–	–	
IC12	TL082CP	IC (M)	TEXAS
IC13	SCV0757-001	Function Module (H)	JVC
IC14	SCV0758-001	Function Module (H)	JVC
IC15	SCV0759-001	Function Module (H)	JVC
IC16	SCV0471-002	Function Module (H)	JVC
IC17	SCV0471-012	Function Module (H)	JVC
Q1	2SC2295(B)	Transistor	MATSUSHITA
Q2	2SC2295(B)	Transistor	MATSUSHITA
Q3	2SC2295(B)	Transistor	MATSUSHITA
Q4	2SC2295(B)	Transistor	MATSUSHITA
Q5	2SC2295(B)	Transistor	MATSUSHITA
Q6	2SC2295(B)	Transistor	MATSUSHITA
Q7	2SC2295(B)	Transistor	MATSUSHITA
Q8	2SA1022(B)	Transistor	MATSUSHITA
Q9	2SC2295(B)	Transistor	MATSUSHITA
Q10	2SC2295(B)	Transistor	MATSUSHITA
Q11	2SK198(Q)	Transistor	MATSUSHITA
Q12	2SA1022(B)	Transistor	MATSUSHITA
Q13	2SC2295(B)	Transistor	MATSUSHITA
Q14	2SA1022(B)	Transistor	MATSUSHITA
Q15	2SA1022(B)	Transistor	MATSUSHITA
Q16	2SA1022(B)	Transistor	MATSUSHITA
Q17	2SC2295(B)	Transistor	MATSUSHITA
Q18	2SC2295(B)	Transistor	MATSUSHITA
Q19	2SC2295(B)	Transistor	MATSUSHITA
Q20	2SC2295(B)	Transistor	MATSUSHITA
Q21	2SA1022(B)	Transistor	MATSUSHITA
Q22	2SA1022(B)	Transistor	MATSUSHITA
Q23	2SC2295(B)	Transistor	MATSUSHITA
Q24	2SC2295(B)	Transistor	MATSUSHITA
Q25	2SC2295(B)	Transistor	MATSUSHITA
D1	MA152A	Diode	MATSUSHITA
D2	–	–	
D3	–	–	
D4	SCV321(A)	V.C. Diode	SANYO
D5	–	–	
D6	SCV321(A)	V.C. Diode	SANYO

Symbol No.	Part No.	Part Name	Description
R22	QVPB613-202	VR	2 K INT SC FINE
R135	QVPB613-104	VR	100 K SC OFFSET
C1	NCB21HK-103	C Cap	0.01 50 V
C2	–	–	
C3	NCB21HK-103	C Cap	0.01 50 V
C4	NCT03CH-101	C Cap	100 P 50 V
C5	NCT03CH-101	C Cap	100 P 16 V
C6	NCT03CH-560	C Cap	56 P 16 V
C7	NCB21HK-103	C Cap	0.01 50 V
C8	NCT03CH-101	C Cap	100 P 50 V
C9	QEJ41AM-106	T Cap	10 10 V
C10	NCT03CH-560	C Cap	56 P 16 V
C11	NCB21HK-103	C Cap	0.01 50 V
C12	NCF21EZ-104	C Cap	0.1 50 V
C13	NCB21HK-103	C Cap	0.01 50 V
C14	NCF21EZ-104	C Cap	0.1 50 V
C15	–	–	
C16	–	–	
C17	NCT03CH-390	C Cap	39 P 16 V
C18	–	–	
C19	QEJ41AM-476	T Cap	47 16 V
C20	NCT03CH-151	C Cap	150 P 16 V
C21	QEJ41AM-106	T Cap	10 10 V
C22	QEJ41CM-106	T Cap	10 16 V
C23	NCF21EZ-104	C Cap	0.01 50 V
C24	NCS21HJ-270	C Cap	27 P 50 V
C25	QEJ41VM-224	T Cap	0.022 35 V
C26	QEJ41AM-476	T Cap	47 10 V
C27	QEJ41CM-106	T Cap	10 16 V
C28	QEJ41AM-475	T Cap	4.7 10 V
C29	QER41HM-475	E Cap	4.7 50 V
C30	QER41HM-475	E Cap	4.7 50 V
C31	QER41HM-105	E Cap	1 50 V
C32	–	–	
C33	QEJ41AM-106	T Cap	10 10 V
C34	NCB21HK-272	C Cap	0.0027 50 V
C35	NCS21HK-561	C Cap	560 P 50 V
C36	NCF21EZ-104	C Cap	0.1 50 V
C37	QER41HM-105	E Cap	1 50 V
C38	–	–	
C39	NCF21EZ-104	E Cap	0.1 50 V
C40	NCT03CH-470	C Cap	47 P 16 V
C41	NCF21EZ-104	C Cap	0.1 50 V
C42	–	–	
C43	NCS21HJ-221	C Cap	220 P 50 V
C44	NCB21HK-333	C Cap	0.033 50 V
C45	NCF21EZ-104	C Cap	0.1 50 V
C46	NCF21EZ-104	C Cap	0.1 50 V
C47	NCF21EZ-104	C Cap	0.1 50 V
C48	NCF21EZ-104	C Cap	0.1 50 V
C49	QEJ41VM-105	T Cap	1 35 V
C50	NCB21HK-333	C Cap	0.033 50 V
C51	QEJ41VM-105	T Cap	1 35 V
C52	QEJ41VM-106	T Cap	10 10 V

Symbol No.	Part No.	Part Name	Description
C53	QAT3001-011	TR Cap	18 P H. LOCK
C54	NCS21HJ-3R0	C Cap	3 P 50 V
C55	QCT05UJ-390	C Cap	39 P
C56	NCB21HK-103	C Cap	0.01 50 V
C57	NCF21EZ-104	C Cap	0.1 50 V
C58	–	–	
C59	–	–	
C60	–	–	
C61	–	–	
C62	–	–	
C63	QER41EM-106	E Cap	10 16 V
C64	QER41CM-476	E Cap	47 16 V
C65	QER41HM-105	E Cap	1 50 V
C66	QETA1AM-477	E Cap	470 10 V
C67	–	–	
C68	QER41CM-476	E Cap	47 16 V
C69	QER41CM-476	E Cap	47 16 V
C70	–	–	
C71	QEJ41AM-106	T Cap	10 10 V
C72	–	–	
C73	QER61EM-106	E Cap	10 25 V
L1	SCV0331-820	Peaking Coil	82 μH
L2	SCV0331-120	Peaking Coil	12 μH
L3	SCV0331-220	Peaking Coil	22 μH
L4	–	–	
L5	SCV0331-101	Peaking Coil	100 μH
LC1	DST306-92B102M	LC. Filter	
X'tal 1	SCV0351-001	CRYSTAL	TCXO (14.31818 MHz)
X'tal 2	SCV0351-002	CRYSTAL	
T1	GC44286-001	Trans	SC FREQ.
CN1	SCV0343-001	Connector	
CN2	SCV1227-002	Connector	4 Pin
CN9	SCV0343-001	Connector	40 Pin
	SC41023-001	Sheet	
	SCV1227-005	Connector	5 Pin
	SS30644-006	Connector	6 Pin

6.9 PS board assembly 10

10☐☐☐☐☐☐

Symbol No.	Part No.	Part Name	Description
⚠ IC1	M5230L	IC	TOSHIBA
⚠ IC3	TA7089P	IC	TOSHIBA
⚠ IC4	NJM7805A	IC	JRC
⚠ IC5	NJM7805A	IC	JRC
Q4	2SA564(R)	Transistor	MATSUSHITA
Q5	2SC1685(R)	Transistor	MATSUSHITA
D1	SIBOI-02	Diode	FUJI ELECTRIC
⚠ D3	S4VB20	Diode	SHINDENGEN
⚠ D4	S4VB20	Diode	SHINDENGEN
⚠ D5	ERC81-004H	Diode	FUJI ELECTRIC
⚠ D6	ERC81-004H	Diode	FUJI ELECTRIC
⚠ D7	ERC81-004H	Diode	FUJI ELECTRIC
⚠ D8	ERC81-004H	Diode	FUJI ELECTRIC
R1	QRD161J-331	CR	330 1/6 W
R2	QRD161J-331	CR	330 1/6 W
R3	QRX029J-R47	MFR	0.47 2 W
R4	QRD161J-221	CR	220 1/6 W
R5	QRX029J-R47	MFR	0.47 2 W
R6	QRD161J-221	CR	220 1/6 W
R7	QRD161J-822	CR	8.2 K 1/6 W
R8	QVPB614-102	VR	1 K
R9	QRD161J-182	CR	1.8 K 1/6 W
R10	QRD161J-153	CR	15 K 1/6 W
R11	QRD161J-153	CR	15 K 1/6 W
R12	QRD161J-151	CR	150 1/6 W
R13	QRX029J-R47	MFR	0.47 2 W
R14	QRD161J-123	CR	12 K 1/6 W
R15	QVPB614-202	VR	2 K
R16	QRD161J-332	CR	3.3 K 1/6 W
R17	QRD161J-0R0	CR	0 1/6 W
R18	QRD161J-561	CR	560 1/6 W
R19	QRD161J-561	CR	550 1/6 W
C1	QET71VM-478	E Cap	4700 35 V
C2	QEV71ER-478	E Cap	4700 25 V
C3	QEV71ER-478	E Cap	4700 25 V
C4	–	–	
C5	–	–	
C6	–	–	
C7	–	–	
C8	QEV71ER-478	E Cap	4700 25 V
C9	QETA1HM-105	E Cap	1 50 V
C10	QEX41CM-156	E Cap	15 16 V

Symbol No.	Part No.	Part Name	Description
C11	QETA1CM-107	E Cap	100 16 V
C12	QEX41EM-225	E Cap	2.2 25 V
C13	QETA1EM-107	E Cap	100 25 V
C14	QFN41HJ-103	MY Cap	0.01 50 V
C15	QETA1CM-476	E Cap	47 16 V
C16	QEX41EM-225	E Cap	2.2 25 V
C17	QEX41CM-106	E Cap	10 16 V
C18	QFN41HJ-104	MY Cap	0.1 50 V
C19	QEX41EM-225	E Cap	2.2 25 V
C20	QFN42EK-473	E Cap	0.047 250 V
⚠ F1 ⚠ F2 ⚠ F3 ⚠ F4	Refer to the section 1.		
CN7	SCV1227-014	Connector	14 Pin
CN8	SCV1227-006	Connector	6 Pin
⚠ CN13	SCV1228-012	Connector	12 Pin
⚠ CN17	SM3490-004	Connector	4 Pin
⚠ CN18	SM3490-003	Connector	3 Pin
CN44	SCV1227-003	Connector	3 Pin
	● C board assembly		
C21	QEV71VR-688	E Cap	6800 35 V

6.10 TL board assembly 09

09□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	TC4099BP	IC	TOSHIBA
IC2	TD62083AP	IC	TOSHIBA
PC1	PC817D	Photo Coupler	SHARP (for GPI)
D1	MA165	Diode	MATSUSHITA
R1	QRD161J-102	CR	1 K 1/6 W
R2	QRD161J-102	CR	1 K 1/6 W
RY1	SCV1551-005	Relay	Tally
RY2	SCV1551-005	Relay	Tally
RY3	SCV1551-005	Relay	Tally
RY4	SCV1551-005	Relay	Tally
RY5	SCV1551-005	Relay	Tally
RY6	SCV1551-005	Relay	Tally
RY7	SCV1551-005	Relay	Tally
RY8	SCV1551-005	Relay	Tally
CN10	SC42462-010	Connector	10 Pin

6.11 MT board assembly 11

11□□□□□□

Symbol No.	Part No.	Part Name	Description
CN1	SCV1196-090	Connector	90 Pin
CN2	SCV1196-090	Connector	90 Pin
CN3	SCV1196-090	Connector	90 Pin
CN4	SCV1196-090	Connector	90 Pin
CN5	SCV1196-090	Connector	90 Pin
CN6	SCV1196-032	Connector	32 Pin
CN7	SCV1074-014	Connector	14 Pin
CN8	SCV1228-006	Connector	6 Pin
CN9	SC42462-034	Connector	34 Pin
CN10	SC42462-010	Connector	10 Pin
CN11	SC42462-014	Connector	14 Pin
CN12	SC42462-034	Connector	34 Pin
CN13	SC42462-010	Connector	10 Pin
CN14	SC42462-026	Connector	26 Pin

6.12 BNC board assembly [1][2]

[1][2]☐☐☐☐☐☐

Symbol No.	Part No.	Part Name	Description
R1	QRV141F-75R0AY	MFR	75 1/4 W
R2	QRV141F-75R0AY	MFR	75 1/4 W
R3	QRV141F-75R0AY	MFR	75 1/4 W
R4	QRV141F-75R0AY	MFR	75 1/4 W
R5	QRV141F-75R0AY	MFR	75 1/4 W
R6	QRV141F-75R0AY	MFR	75 1/4 W
R7	QRV141F-75R0AY	MFR	75 1/4 W
R8	QRV141F-75R0AY	MFR	75 1/4 W
R9	QRV141F-75R0AY	MFR	75 1/4 W
R10	QRV141F-75R0AY	MFR	75 1/4 W
R11	QRV141F-75R0AY	MFR	75 1/4 W
R12	QRV141F-75R0AY	MFR	75 1/4 W
R13	QRV141F-75R0AY	MFR	75 1/4 W
R14	QRV141F-75R0AY	MFR	75 1/4 W
R15	QRV141F-75R0AY	MFR	75 1/4 W
R18	QRD161J-820	CR	82 1/6 W
R19	QRD161J-121	CR	120 1/6 W
R20	QRV141F-75R0AY	MFR	75 1/4 W
R21	QRV141F-75R0AY	MFR	75 1/4 W
R22	QRV141F-75R0AY	MFR	75 1/4 W
S1	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S2	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S3	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S4	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S5	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S6	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S7	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S8	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S9	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S10	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S11	SCV0337-002	Toggle Switch	75 Ω ON/OFF
S12	SCV0337-002	Toggle Switch	75 Ω ON/OFF
CN1	SC31181-10-12	Connector	10 Pin
CN2	SC31181-14-12	Connector	14 Pin
CN3	SC31181-26-12	Connector	26 Pin
CN4	SC31181-34-12	Connector	34 Pin

6.8 SG board assembly (PAL version) 07

07□□□□□□

Symbol No.	Part No.	Part Name	Description
IC1	SCV0322-002	IC	JVC
IC2	UPD74HC04C	IC	NEC
IC3	SCV0486-001	IC	JVC
IC4	HA11244	IC	HITACHI
IC5	TC40H002P	IC	TOSHIBA
IC6	TC40H000P	IC	TOSHIBA
IC7	TC40H000P	IC	TOSHIBA
IC8	UPD74HC00C	IC	NEC
IC9	TC4528BP	IC	TOSHIBA
IC10	TC4053BFTP2	IC	TOSHIBA
IC11	SN74LS93N	IC	MOTOROLA
IC12	TL082CP	IC	TEXAS
IC13	SCV0757-001	IC	JVC
IC14	SCV0758-001	IC	JVC
IC15	SCV0759-001	IC	JVC
IC16	SCV0471-002	IC	JVC
IC17	SCV0471-012	IC	JVC
IC18	SCV0532-001	IC	JVC
IC19	AN614	IC	MATSUSHITA
IC20	AN614	IC	MATSUSHITA
IC21	SCV0933-001	IC	JVC
Q1	2SC2295(B.C)	Transistor	
Q2	2SC2295(B.C)	Transistor	
Q3	2SC2295(B.C)	Transistor	
Q4	2SC2295(B.C)	Transistor	
Q5	2SC2295(B.C)	Transistor	
Q6	2SC2295(B.C)	Transistor	
Q7	2SC2295(B.C)	Transistor	
Q8	2SA1022(B.C)	Transistor	
Q9	2SC2295(B.C)	Transistor	
Q10	2SA1022(B.C)	Transistor	
Q11	2SA1022(B.C)	Transistor	
Q12	DTC124K	Digital Transistor	
Q13	2SA1022(B.C)	Transistor	
Q14	2SC2295(B.C)	Transistor	
Q15	2SC2295(B.C)	Transistor	
Q16	2SC2295(B.C)	Transistor	
Q17	2SC2295(B.C)	Transistor	
Q18	2SC2295(B.C)	Transistor	
Q19	2SC2295(B.C)	Transistor	
Q20	2SC2295(B.C)	Transistor	
Q21	2SC2295(B.C)	Transistor	
Q22	2SC2295(B.C)	Transistor	
Q23	2SJ84(Q.R)	FET	
Q24	2SK198(Q.R)	FET	
Q25	2SC2295(B.C)	Transistor	
Q26	2SA1022(B.C)	Transistor	
Q27	2SC2295(B.C)	Transistor	
Q28	2SA1022(B.C)	Transistor	
Q29	DTC124K	Digital Transistor	
Q30	2SA1022(B.C)	Transistor	

Symbol No.	Part No.	Part Name	Description
D1	SVC321(A)	V.C. Diode	
D2	MA152A	Diode	
D3	SVC321(A)	V.C. Diode	
D6	SVC321(A)	V.C. Diode	
D9	MA152A	Diode	
D10	MA152A	Diode	
R37	QVPB613-104	VR	SC OFFSET
C1	NCB21HK-103	C Cap	0.01
C2	NCS21HJ-220	C Cap	22 P
C3	NCB21HK-103	C Cap	0.01
C4	NCT03CH-101	C Cap	100 P
C5	NCT03CH-101	C Cap	100 P
C6	NCT03CH-560	C Cap	56 P
C8	NCB21HK-103	C Cap	0.01
C9	NCF21EZ-104	C Cap	0.1
C10	NCB21HK-103	C Cap	0.01
C11	QEJ41CM-106	T Cap	10 16 V
C12	NCS21HJ-151	C Cap	150 P
C13	QEJ41AM-106	T Cap	10 10 V
C14	QEJ41CM-106	T Cap	10 16 V
C15	NCB21HK-103	C Cap	0.01
C16	QEJ41AM-106	T Cap	10 10 V
C17	NCT03CH-101	C Cap	100 P
C18	NCB21HK-103	C Cap	0.01
C19	QEJ41CM-106	T Cap	10 16 V
C20	NCT03CH-390	C Cap	39 P
C21	NCB21HK-333	C Cap	0.033
C22	NCF21EZ-104	C Cap	0.1
C23	QEJ41AM-476	T Cap	47 10 V
C25	QEJ41VM-105	T Cap	1 35 V
C26	QEJ41AM-106	T Cap	10 10 V
C27	QEJ41VM-105	T Cap	1 35 V
C28	QEJ41VM-105	T Cap	1 35 V
C29	QEJ41AM-476	T Cap	47 10 V
C30	QER41HM-475	E Cap	4.7 50 V
C31	QER41HM-105	E Cap	1 50 V
C32	QER41HM-475	E Cap	4.7 50 V
C33	QEJ41AM-106	T Cap	10 10 V
C34	NCB21HK-272	C Cap	2700 P
C35	NCS21HJ-561	C Cap	560 P
C36	NCF21EZ-104	C Cap	0.1
C37	QER41HM-105	E Cap	1 50 V
C38	NCS21HJ-221	C Cap	220 P
C39	QEJ41AM-106	T Cap	10 10 V
C40	NCF21EZ-104	C Cap	0.1
C41	NCF21EZ-104	C Cap	0.1
C42	NCF21EZ-104	C Cap	0.1
C43	NCF21EZ-104	C Cap	0.1
C44	NCS21HJ-470	C Cap	47 P
C45	NCS21HJ-470	C Cap	47 P
C46	QER41EM-106	E Cap	10 25 V

Symbol No.	Part No.	Part Name	Description
C47	NCF21EZ-104	C Cap	0.1
C48	NCF21EZ-104	C Cap	0.1
C49	NCT03CH-470	C Cap	47 P
C50	QAT3001-011	TR Cap	20 P SC LOCK
C51	NCF21EZ-104	C Cap	0.1
C52	NCF21EZ-104	C Cap	0.1
C54	QEJ41AM-106	T Cap	10 10 V
C56	QER41AM-476	E Cap	47 10 V
C57	QER41EM-106	E Cap	10 25 V
C58	QAT3001-011	TR Cap	20 P H LOCK
C59	NCB21HK-103	C Cap	0.01
C60	NCT03CH-101	C Cap	100 P
C61	QETC1AM-227	C Cap	220 10 V
C62	QER41EM-106	E Cap	10 25 V
C63	QER41CM-476	E Cap	47 16 V
C64	QEJ41CM-476	T Cap	47 16 V
C65	NCS21HJ-330	C Cap	33 P
C66	NCB21HK-103	C Cap	0.01
C67	NCF21EZ-104	C Cap	0.1
C68	QER41HM-476	E Cap	47 10 V
C69	QER41AM-476	E Cap	47 10 V
C70	NCB21HK-103	C Cap	0.01
C71	QEJ41AM-106	C Cap	10 10 V
C72	NCB21HK-103	C Cap	0.01
C73	NCB21HK-103	C Cap	0.01
C74	NCF21EZ-104	C Cap	0.1
C75	QEJ41CM-106	T Cap	10 16 V
C77	NCT03CH-101	C Cap	
C78	NCF21EZ-104	C Cap	
C79	NCT03CH-560	C Cap	
C81	NCB21HK-103	C Cap	
C82	QEX41AM-156	E Cap	
C83	NCT03CH-150	C Cap	
L1	SCV0331-820	Peaking Coil	
L2	SCV0331-120	Peaking Coil	
L3	SCV0331-220	Peaking Coil	
L5	SCV0331-101	Peaking Coil	
L6	SCV0331-470	Peaking Coil	
LC1	EXC-EMT102BT	EMI Filter	
T1	SCV0171-001	Trans	
T2	SCV0171-001	Trans	
X1	SCV0352-001	CRYSTAL	
X2	SCV0348-002	CRYSTAL	
X3	SCV0349-002	CRYSTAL	
CN1	SCV0343-001	Connector	
CN36	SCV1227-002	Connector	